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Diseases of Fruit and Nut Crops In the United States in 1925

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UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FRUIT AND NUT CROPS IN THE UNITED STATES IN 1925

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INTRODUCTION

The reader of this summary will probably be impressed by the fact that the year 1925 was very unique in so far as it demonstrated, to an unusual extent, the correlation of weather factors and disease occurrence on the fruit crops of the United States. It is suggested at this point that the reader first glance over the abstracts of the monthly conditions of temperature and precipitation and the departures from normal given on pages 173 to 179 in order to get a better interpretation of the comparatively slight fungous losses on fruits reported for 1925. It is a well-known fact that weather is probably the most important factor in the occurrence, development, and spread of plant diseases in any particular year. In view of the fact that the country-wide status of the weather in 1925 was in many respects the most extraordinary of the past 50 years, it will be interesting to note how this condition is reflected in the comparatively slight losses suffered from fungous diseases of fruits.

The predominance of data on apple diseases which is again apparent as in previous years is due, very likely, to the widespread distribution of the host, but is out of proportion to the economic importance of this fruit compared with the other fruits such as citrus, grapes, peaches, strawberries, etc.

It was considered to be a worth-while departure from the procedure in previous summaries on fruit diseases to include at the very beginning of the 1925 summary a brief digest presenting what appears to the writer to be some of the noteworthy and interesting contributions for the year. This digest will enable the reader to select those contributions and give them his detailed attention if he desires.

DIGEST OF NOTEWORTHY OBSERVATIONS CONTAINED IN THIS SUMMARY

The unusually small damage caused by fungous diseases in 1925 was probably the main factor in the production of a larger commercial apple crop than in 1924, in spite of the fact that the total apple production in the United States was approximately seven-and-a-half million bushels less than in 1924. Country-wide weather conditions in 1925 were most unfavorable for the development and spread of fungous diseases of fruits.

Ascospore ejection studies of Venturia inaequalis were given particular emphasis in 1925. Data from Wisconsin, Minnesota, New York, Pennsylvania, New Jersey, West Virginia, Virginia, and Tennessee indicate a rather close correlation between dates of heaviest ascospore ejection and subsequent infection by this fungus. In the Northern States the heaviest spore ejections occurred previous to and during the prepink and pink stage of the blossoms. In the Southern and East Central States the period of maximum ejection occurred somewhat later, just before and during pink and calyx closing periods. The result of this was to make the delayed dormant and prepink sprays relatively more important in the North than farther South. Unusually late scab infection caused most of the losses from this disease in New York and Minnesota in 1925.

Blotch control experiments with various fungicides gave striking results in New Jersey, Ohio, Illinois, Tennessee, and Virginia. The relative control value of each blotch spray has been correlated with blotch spore exudation from cankered twigs in Virginia. The etiology and control of blotch have been treated in a very comprehensive manner by Guba (Illinois Sta. Bul. 256).

Studies of cedar rust spore discharges and the correlation of percentage and intensity of rust infection on York Imperial apple leaves with distance from uncut cedar tree areas were made in Virginia. Notable results in cedar rust control due to the cutting out of the intermediate host, the red cedar, were also reported from that state.

Injury of fruit by blackrot was directly correlated with codling moth injury in Virginia and Indiana. In Missouri blackrot followed hail injury, while in Minnesota it was reported following fireblight.

A new apple rot which looks like blackrot but which is caused by Botryosphaeria instead of Physalospora has been described by Shear, Fenner, and others.

Apple bitter rot spore exudation studies in relation to rainfall were conducted at Winchester, Virginia. The first instance ever reported in the East of the overwintering of this fungus in twigs and fruit infection from this source was observed at Winchester. Twig infection had previously been reported in South Carolina.

Bacillus amylovorus, causing blight on apples, pears, and quinces is one of the few diseases reported to be of greater prevalence than normally in the United States in 1925. It was reported on cherry from Michigan and Kansas. An outstanding contribution treating of the behavior of Bacillus amylovorus was made by Nixon. Migration of the organism in the form of zoogloea through intercellular spaces and the formation of cysts within the central vacuoles and hibernation in this form were determined in this study.

Notable results in research on crowngall were recorded in 1925. Toxic relations between black walnuts and apples were reported by Schneiderhan of Virginia

Losses due to frost injury on apples, pears, peaches, cherries, and plums were very extensive in most of the North Central and East Central States in 1925. Frost injury was the limiting factor in many states. The largest hail insurance adjustment ($53,000) ever paid for injury in one apple orchard in the United States was reported from Mt. Jackson, Virginia.

A new apple canker and fruit rot (Gloeosporium perennans) in Washington and Oregon was described by Zeller and Childs. A new storage disease resembling soft scald of apples was reported from Oregon.

Sulfur dust applied to peaches two or three weeks before picking in rainy weather considerably reduced brownrot in transit. The practicability of peach dusting in Georgia and cranberry dusting in New Jersey by using airplanes is also mentioned.

Five years of investigation by H. W. Anderson on the overwintering habits of Bacterium pruni under Illinois conditions have shown that the common source of initial infection is not the cankered twigs alone but also infected leaves. Anderson's work on the control of bacterial spot (Bacterium pruni) with sodium silico-fluoride also is notable. The preliminary results indicate the possibility of using this material as a fungicide to control the disease. The reports on the non-occurrence of peach yellows in Illinois and Indiana and on the local outbreak of it in Michigan are noteworthy. The role of Aphis rubiphila in the transmission of raspberry leafcurl has been determined by Smith. The possibility of false blossom of cultivated cranberries being caused by an infectious agent is indicated by the investigations carried on by Stevens this year. Spraying experiments in pecan scab control carried on by Demaree indicate that bordeaux mixture is the most effective fungicide, while Neal, of Mississippi, reports distinct advantages in using bordeaux oil emulsion.

SOME SUGGESTIONS TO COLLABORATORS

Better Cooperation on the Part of Collaborators Needed

The writer being a collaborator may be pardoned for offering some suggestions to his colleagues on this subject. There is great diversity in the quality and quantity of the data supplied. Not all the collaborators are contributing satisfactory data regarding the major crops in their state, even in cases in which certain diseases are among the limiting factors in the production of these crops. The compilers of the annual disease summaries have been greatly impressed by the small amount of information available regarding certain crops and from different states. An examination of the annual fruit and nut disease summaries of the past three years shows that every compiler has made constructive suggestions for the improvement of the annual survey, and there has been some improvement, particularly in the data submitted from the Far West and from certain states west of the Mississippi. It is, however, plainly apparent to any one who makes a critical inspection of the data included in the present summary that there is room for much additional improvement and that the annual compilations for the various crops cannot be of maximum usefulness unless more complete and accurate information is supplied.

In reviewing the attitude of former compilers the following quotations were taken from the last three annual fruit disease summaries:

Adams, J. F. Supplement 28: 268. 1922. "In summarizing the data by collaborators in 1922 certain conditions have been stated and suggestions made which are pertinent to disease problems in general. Greater cooperation along certain lines indicated in the summary would assist materially in explaining and coordinating disease conditions and contribute to the working out of more efficient control measures. The Plant Disease Survey affords a 'clearing house' for brief reports on the results of investigations that might seriously be delayed through other means of publication."

Orton, C. R. Supplement 33: 36. 1923. "Practically all of the reports in 1923 came from the eastern half of the United States, while only a few scattered reports came from the rest of the country. From the great fruit-producing state of California a very meager amount of information was available. The Plant Disease Survey can never hope to carry out its purpose in a fully creditable way until full cooperation from collaborators in each state is secured."

Giddings, N. J. Supplement 39: 2. 1924. "During the next few years there is going to be a tremendous increase in the use of the records of the Plant Disease Survey Office and every one of the collaborators who does his best to turn in accurate and valuable data will be amply repaid in more ways than one. Of course it is understood the plant-disease problems are of more importance in some states than others and that the facilities and funds are inadequate for much plant-disease survey work in most of the states. That phase of the problem is one which we must keep in mind, but in the meantime we can all do our best with the facilities that are available."

It is obvious that the plant-disease summaries cannot include all the details of pathological research and disease conditions in every state every year, but the most outstanding events can and ought to be set forth clearly in a publication of this kind so that a plant pathologist in any state or in foreign parts can by reading the summary ascertain such facts as are most important in the disease status of any particular state.

There is little doubt that the annual summaries of diseases of fruits, cereals, vegetables, and ornamentals are the most comprehensive effort in that direction made by any organization in the United States. If these summaries are not what they should be the fault lies with us. It indicates that we, the collaborators, are not properly informed of plant-disease conditions in our own states or else we lack the time or the inclination to furnish the disease data. In either case we show a lack of appreciation of the increasing value of these annual summaries and furthermore we are not availing ourselves of an opportunity to become better known as phytopathologists.

A New Annual Report Form

Examination of the survey cards filled out by collaborators during the past five years shows that less than 50 per cent of the data requested is actually entered. This is the fault of either the card or the collaborators. Upon the assumption that the former is the chief cause, considerable thought has been given to the preparation of a new report blank, and previous compilers of the summaries have been requested to contribute their ideas toward its formulation. The result is a new survey card, which it is hoped will be found considerably better than the one used hitherto. The varying terminology possible in former cards has been largely eliminated by a simple checking of definite terms printed on the new card. There are other features which will obviously make it easier for the collaborator to submit his data. The new form of survey card will be found following this discussion. It represents the effort of the Plant Disease Survey to get more definite data, to facilitate the making out of reports by the collaborators and to eliminate such features of the old cards as were deemed impracticable. As is noted on

Crop..... Disease..... Space to be used for printing (State)

Cause..... Year.....

Crop Importance (Check): major..... / minor..... / occasional plantings..... / not grown commercially...	Prevalence compared with last year (Check): much more... / more..... / same..... / less..... / much less...	Prevalence compared with average year (Check): much more... / more..... / same..... / less..... / much less...	Importance of this disease in an average year (Check): very..... / moderate... / slight.....

Loss for State (Use figures above 0.1%; mark trace below 0.1%): % reduction in yield..... / % loss in grade, storage, transit, etc... / Total loss..... / Maximun % infection in any one field.....	Geographic distribution in State this year: General( )Local( )Scattered( ) (Check) Explain	Earliest recorded appearance of disease this year: Date..... (month) (day) Place..... (town) (county)	Period of maximum injury: Season (Check) Early... / Mid..... / Late.... Stage of host

Weather relations this year

Moisture (Check): Favorable..... / Unfavorable... to disease — Explain

Temperature (Check): Favorable..... / Unfavorable... to disease — Explain

Varietal susceptibility this year

Varieties immune :

" very resistant :

" resistant :

" susceptible :

" very susceptible:

General remarks: basis of loss estimate, new work, control measures, unusual observations, etc.

Note: Do not attempt to answer all these questions unless definite data are available.

Reported by.....

the forms, it is not expected that all the information for which space is provided will or can be supplied. Reports should be made only on matters regarding which reasonably definite and accurate information is available -- in other words quality is much more important than quantity.

Suggestions for Improving Collaborators' Reports

(1) More definite records in all states of dates of the first and maximum appearance of diseases, dates of spray applications, dates of maximum injury to crops, and more careful judgment in making estimates of losses by diseases and other injuries to crops.

(2) A careful examination of annual field, laboratory, and other Departmental reports for the purpose of selecting and submitting to the Plant Disease Survey the most important results obtained during the current year's work.

(3) Every collaborator should send in the disease card of every crop, regardless of whether the disease occurs or whether the crop is grown in that particular state or not. Notation on the card whether the crop or the disease occurs would be a great help in preparing the summaries at headquarters.

(4) Sending in of survey cards before the close of the year. This will greatly expedite the difficult task of compiling the data for the annual summaries.

THE WEATHER OF 1925

In many respects the weather conditions of 1925 were the most unique of the past 50 years. It was unusually hot and dry and the combination over most of the United States resulted in a smaller loss from fruit diseases than in 1924 or in the average year. There were, of course, local areas within states where dry, warm weather did not prevail. It is a difficult task to correlate weather with disease occurrence over so large a geographical area as the United States. Specific correlations are possible only in limited areas of individual states, therefore, any statement made in this supplement in regard to country-wide correlation of weather and fungous disease occurrence must necessarily be construed as a general average to which local exceptions will occur.

TEMPERATURE

It is unusual to have the month of April show above-normal temperatures in every state in the Union. The average temperature for the twelve months was above-normal in every state in 1925, which is another unique record. An examination of the data in table 35 shows that of the months from April to September inclusive, the important growing months in the largest part of the United States, only May was subnormal in temperature. Extreme temperature

variations occurred in June when 123° was recorded in California and below freezing temperatures in Montana and the Oregon mountain section. The only month which was considerably below normal in temperature was October, during which the temperatures in the central and northern states east of the Rocky Mountains were the lowest on record for that month during the past 50 years.

The following statements of the temperature conditions by months were abstracted from The Monthly Weather Review (Vol. 53. 1925).

January

This month was free from pronounced and widespread cold waves. The greater part of the month was marked by persistent regional contrasts of temperature conditions, some states or portions of states having lasting cold weather while others were experiencing very mild weather.

February

The outstanding feature of the month was the mild temperature experienced in practically all parts of the country. There was an absence of cold waves. The condition resulted probably from the great barometric depressions centering over the Gulf of Alaska.

March

March 1925, like February, was characterized by above-normal temperature in all parts of the United States except the extreme southern tip of Florida. It was the second month of above-normal temperatures in all parts of the country, a rare occurrence.

April

Like the months immediately preceding, April 1925 was comparatively warm in practically all parts of the country, especially east of the Mississippi and south of the Ohio. Thus, the temperature was above-normal for the three consecutive months.

May

In the eastern districts an outburst of summer temperatures was experienced on the 23d and 24th. This was suddenly brought to a close by a wave of cool weather that swept southward on the 25-26th. On the whole, the month was was warm in the West and cool in the East, the Rocky Mountains being the dividing line.

June

An unusual June hot spell persisted in central and eastern districts during the first ten days of the month. The average temperature for the month was above-normal, a characteristic of 1925 thus far, except during May. The maximum temperature observed was 123° in California while below freezing temperatures were recorded in the northern mountains.

July

The first two weeks of July were hot over the greater part of the country. During the third week, the temperatures continued high from the Rockies westward. The last decade of the month was gratifyingly cooler. In the Carolinas, Georgia, and certain Northern Plateau regions the monthly means of temperature were among the highest on record.

August

This month like its immediate predecessor was warm and dry. The coolest periods were during the first part of the month in portions of the central valleys, but mainly during the last decade over the remaining portions of the country. Readings below freezing were reported in all northern border states. In the mountains of Oregon a temperature of 14° was reached.

September

The single outstanding feature of this month was the sharply contrasted distribution of temperature in various sections of the country. September 1925 set a record for heat unsurpassed in the authentic history of the section east of the Mississippi and south of the Ohio drainage systems and will probably stand unsurpassed for as long a time in the future. The weather was moderately cool in districts west of the Rockies and below freezing temperatures were recorded in the northern tier of states.

October

This month is the first in 1925 having a temperature considerably below normal. No previous October in the past 30 years or more has had such low temperatures over nearly all central and northern districts from the Rocky Mountains eastward.

November

Important temperature changes were rapid and frequent but the monthly averages were mainly not far from normal. Average temperatures were above-normal on the Pacific Coast, along the entire northern border, and over New England. A moderately cool area covered the southeastern states and other districts east of the Mississippi except along the northern border, New England, and Florida. The lowest temperature reported was 21° below zero in the mountains of Colorado.

December

West of the Rocky Mountains the weather was moderately warm throughout the month, in fact, portions of the far Northwest had the highest December averages known. From the Great Plains eastward and generally over the southern states the temperatures were below normal except in portions of the North Atlantic States and extreme southern Florida.

In table 35 the data relative to the departures from normal of both temperature and precipitation for all states during April to September inclusive are given.

PRECIPITATION

The year 1925 will probably be long remembered as one of the driest in the history of the United States Weather Bureau records. From January to October, the average precipitation throughout the country was far below normal. In the southern Appalachian section, the drought was of unprecedented severity and duration, causing the oldest springs to dry up and resulting in general inconvenience and hardship. Nothing comparable to it is on record for the entire history of that section. It has been observed that even in years of sub-normal rainfall throughout the country certain spring or summer months will show above-normal precipitation, but in 1925 every month from January to October was sub-normal.

The following discussion treats of rainfall conditions by months during 1925. This information was abstracted from The Monthly Weather Review (Vol. 53. 1925).

January

Viewed as a whole, the month was one of scanty precipitation, except in south central, southeastern, east central and far northwestern states. Severe floods followed a considerable excess of rain in southeastern states. In California and Arizona the water shortage was serious.

February

This month was remarkably dry, particularly in the southern sections. From central California northward, the precipitation was mainly above-normal. Serious drought conditions prevailed from central Texas and Oklahoma to the eastern coast. In the northern states the precipitation was less than usual during this month.

March

A marked deficiency in precipitation existed over much of the country except New England, New York, and Montana. In certain sections of the cotton belt the rainfall was the least in 50 years. The drought in southern California was broken. In New Mexico a severe drought had existed for over a year.

April

Precipitation as a rule was mostly below normal except in Arkansas, Oklahoma, western and northern Texas, where the drought was relieved during the last decade of the month. The drought is becoming increasingly serious in Colorado and New Mexico.

May

A shortage of precipitation was rather general in central and eastern districts and curiously enough there were generous rains in California, sufficiently heavy to injure crops locally. All states had sub-normal rainfall except Florida, New Mexico, California, and Oregon.

June

This monthwwas warm and dry except in the Missouri and upper Mississippi Valleys and New England where precipitation was greater than usual.

July

The monthly precipitation was far less than normal throughout the country except in New England and the east coast states as far south as Maryland. Nevada had the heaviest precipitation on record while the Carolinas and Georgia had the lightest in 50 years. The water shortage in the southern Appalachian states was acute.

August

This month, like its immediate predecessor, was very dry. In the Southeast, the Southwest and in some north central states the drought of July was intensified with the result that a most serious situation with regard to stock and even for domestic purposes obtained in many localities.

September

September added another to the long list of months in 1925 deficient in precipitation. The drought in the southeastern sections of the country remained unbroken. Favorable rains fell in Texas and northeastward to the Great Lakes section.

October

The plentiful precipitation over most districts was in sharp contrast to that of many of the months preceding and very generally relieved the severe drought in the Southeast. Precipitation was far in excess of the normal over the lower Mississippi Valley and Gulf States.

November

From the Rocky Mountains eastward the bulk of the precipitation occurred during the first half of the month. Above-normal rainfall occurred in the Southern Plains Lake area eastward to the Atlantic. Below normal rainfall occurred from the upper Lakes westward including the Missouri Valley, the Plateau Section and the Pacific Coast States, except southern California. The November totals in parts of Florida, notably at Miami, were the largest on record for that month.

December

For the country as a whole precipitation was deficient in nearly all the states, and even where in excess, the margins above-normal were small except in Florida and locally along the South Atlantic Coast where the excesses were mainly due to heavy rains attending the tropical storm of the first and second. In the far West, precipitation was everywhere less than usual in December, except along the immediate cost districts of Washington and in a few other small areas.

Table 35. Departure from the normal temperature and rainfall by states - April to September. (Figures taken from United States Department of Agriculture Monthly Weather Review 53: 1925).

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
New Eng.	+1.9	-2.4	+3.0	-1.0	+0.1	-0.1	-1.08	-0.93	+0.71	+0.83	-1.72	+0.35
N. Y.	+2.0	-4.1	+3.3	-2.0	+0.3	+0.6	-0.29	-0.81	+0.59	+0.89	-1.29	+1.49
N. J.	+2.1	-2.6	+5.1	-1.5	-0.9	+2.1	-1.22	-0.93	-0.64	+2.78	-2.71	-0.71
Pa.	+2.5	-4.9	+4.1	-1.8	-0.7	+3.9	-1.02	-0.30	-1.19	+1.55	-2.24	-0.59
Del.-Md.	+2.7	-3.9	+4.8	-0.5	-1.6	+4.2	-0.77	-1.70	-1.69	+0.68	-1.84	-1.53
Va.	+2.7	-4.6	+4.2	+0.7	-1.6	+5.3	-0.73	-1.78	-1.79	-1.53	-2.12	-1.58
N. C.	+3.5	-2.9	+3.1	+2.1	-0.3	+6.2	-1.34	-1.27	-0.99	-3.18	-2.63	-1.96
S. C.	+3.7	-2.7	+2.8	+1.7	+1.3	+7.3	-0.92	-1.46	-1.71	-2.70	-4.40	-2.14
Ga.	+4.1	-1.7	+2.5	+2.1	+1.1	+8.6	-1.84	-1.59	-1.75	-2.28	-3.73	-2.10
Fla.	+0.4	-1.6	+0.2	+0.3	+0.1	+3.6	-1.25	+1.69	-0.38	+0.18	+0.03	-4.30
Ala.	+4.8	-1.3	+2.9	+1.6	+1.1	+8.2	-2.94	-1.79	-2.06	-0.83	-3.17	-0.85
Miss.	+5.2	-1.0	+2.0	+1.6	+0.6	+7.5	-4.26	-1.43	-1.78	-0.51	-2.02	-0.24
La.	+3.9	-1.4	+1.5	+1.4	+0.4	+4.2	-3.72	-1.73	-0.68	-0.88	-1.98	+1.69
Texas	+5.4	+0.6	+3.3	+2.7	0.0	+2.0	-1.19	-1.01	-1.86	-0.69	-0.38	+1.53
Tenn.	+5.2	-3.1	+4.1	+1.8	+1.0	+8.9	-1.15	-2.20	-1.54	-1.21	-2.63	-0.52
Ky.	+5.3	-4.4	+3.1	-0.2	+0.8	+7.0	-0.86	-1.39	-0.19	-0.29	-2.24	+0.03
W. Va.	+3.4	-4.8	+3.1	-0.9	-0.9	+5.0	-0.80	-0.84	-0.51	+0.21	-2.14	-0.73
Ohio	+4.2	-5.2	+3.6	-1.7	+0.3	+4.6	-1.23	-1.11	-0.98	+0.89	-1.12	+0.90
Ind.	+5.6	-4.1	+3.2	-0.9	+0.3	+6.2	-1.21	-2.80	-0.03	+0.82	-0.76	+2.22
Ill.	+6.8	-3.4	+3.2	-0.1	+0.5	+6.2	-0.75	-2.85	+1.19	-0.48	-0.78	+1.46

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
Mich.	+5.0	-2.9	+2.9	-1.4	+2.0	+2.4	-0.47	-2.26	-0.67	+0.33	-0.51	+0.67
Wis.	+5.6	-2.9	+1.3	-1.1	+1.7	+3.4	-0.41	-2.70	+2.12	+0.57	-1.04	+1.18
Minn.	+6.5	-1.7	-1.0	-1.9	+2.8	+2.9	+0.02	-1.74	+2.82	-0.43	-1.11	+1.38
Iowa	+7.6	-2.4	+1.1	+0.3	+0.7	+4.7	-0.79	-3.45	+2.11	-1.19	+0.03	+1.39
Mo.	+5.9	-3.4	+3.0	+0.5	+0.5	+5.6	+0.38	-2.56	+1.43	-1.34	-0.23	+2.73
Ark.	+6.2	-1.2	+5.5	+1.9	+0.9	+6.6	-2.16	-3.24	-2.00	+1.07	-2.02	+2.63
N. Dak.	+6.1	+1.0	-1.3	-0.8	+2.5	+1.7	+0.26	-1.11	+2.57	-1.27	-1.21	+1.10
S. Dak.	+7.6	+0.6	-0.7	-0.4	+3.3	+4.3	-0.44	-1.45	+2.22	-0.99	-1.01	-0.67
Nebr.	+6.2	-0.3	+1.6	+0.9	+0.2	+3.7	-0.06	-1.49	+0.66	-1.24	+0.65	-0.32
Kans.	+6.2	-0.2	+4.5	+0.8	+0.1	+3.3	+0.92	-1.63	+0.05	-0.20	+0.33	+1.30
Okla.	+6.6	+0.3	+6.2	+2.8	0.0	+2.6	+1.12	-2.24	-1.94	+1.13	-1.66	+3.25
Mont.	+4.5	+2.9	+0.4	+2.3	-0.2	-0.3	+0.81	-0.86	+0.23	-0.38	-0.27	+0.87
Wyo.	+4.4	+3.1	-1.0	+1.4	-0.9	+0.7	+0.14	-0.20	+0.87	-0.16	+0.32	+0.11
Colo.	+4.2	+3.7	+0.9	+1.1	-1.3	+0.7	-1.43	-0.40	+0.31	+0.48	+0.73	+0.41
N. Mex.	+4.2	+3.0	+1.1	+1.1	-1.8	-0.3	-0.95	+0.19	-0.45	+0.78	+0.51	+0.45
Ariz.	+2.2	+3.6	-1.5	+1.2	-1.4	-1.9	+0.18	-0.13	+0.83	-0.43	-0.18	+0.82
Utah	+2.2	+4.1	-2.6	+1.6	-1.6	-1.1	-0.04	-0.40	+1.38	+0.32	+0.62	+0.37
Nev.	+1.7	+4.0	-0.4	+1.6	-2.7	-2.9	+0.61	-0.08	+0.67	+0.56	+0.45	+0.34
Idaho	+2.7	+3.9	+0.3	+2.9	-1.4	-0.5	+0.31	-0.24	+0.38	+0.01	+0.38	+0.42
Wash.	+2.5	+3.0	+1.4	+2.7	-0.5	+0.6	-0.13	-0.17	-0.50	-0.52	-0.16	-0.62
Oregon	+2.6	+3.2	+1.3	+2.9	-1.2	-0.2	+0.55	+0.32	-0.27	-0.34	+0.18	+0.23
Calif.	+0.2	+1.8	+1.0	+1.4	-1.4	-3.1	+1.16	+0.67	+0.27	+0.08	+0.13	+0.01

FRUIT DISEASES OF 1925

DISEASES OF POME FRUITS

APPLE

The total apple production in the United States in 1925 was 164,616,000 bushels compared to 171,250,000 bushels in 1924. However, the commercial production in 1925 was greater, amounting to 31,909,000 barrels compared with 28,063,000 barrels in 1924. The total estimated value of the apple crop in 1925 is $207,820,000.00 while that of 1924 was $202,326,000.00. In the order of production the states ranked as follows: Washington, New York, Idaho, Michigan, and Virginia. The state of Washington produced by far the largest crop of any of the states.

SCAB CAUSED BY VENTURIA INAEQUALIS (CKE.) ADERH.

Geographic distribution

Comparatively speaking, scab was of minor importance in the United States in 1925. As usual, it was co-existent with apple culture. Of the states reporting, one, Tennessee, reported more scab than normal, while New York, Oregon, California, and Tennessee reported more than in 1924. From the information at hand it appears that scab was more prevalent on the Pacific Coast and in New England than in other sections of the country.

Relative prevalence

It is evident that the best criterion for estimating a scab epiphytotic in any particular year is to compare its prevalence with other years. The Plant Disease Survey has data on relative prevalence of scab for the eight-year period 1918-1925, inclusive. The year 1925 represents one of the low water marks for scab during the past eight years. Table 36 shows the relative prevalence of scab in 1925 compared with 1924 and with the average year. Of the states reporting, fourteen reported less scab than normal, four reported normal, and one more than normal. Comparing scab prevalence in 1925 with 1924, only five states, New York, New Hampshire, Oregon, Tennessee, and Washington reported more scab, while fifteen states reported less, and five others reported the same as the year previous.

J. F. Adams of Delaware reports, "Prevalence much less than last two years. High temperatures and small rainfall have held disease in check.

In Virginia, according to Fromme, "The crop for the state as a whole is quite free from scab and there will be comparatively slight loss." From the same state Schneiderhan reports, "Studies of scab infection cycles in 1924 and 1925 indicate a striking contrast. In 1924 there were four distinct cycles of infection, while in 1925 there was only one primary cycle with practically no secondary infection."

From Ohio, Young reports, "Apple scab is of minor importance this year where any type of spraying or dusting was done."

In Minnesota, according to the Section of Plant Pathology, "During the rainy period early in September, considerable leaf infection developed in most of the apple regions. Up to this time there had been very little scab especially on the fruit which was almost entirely free."

From Washington, which produced the largest apple crop in the country this year, the Department of Plant Pathology reports, "Apple scab has been very scarce in eastern Washington and much less common and severe than usual in the western part of the state."

In Oregon, one of the few states reporting more scab than 1924, according to Barss, "Long continued cool, wet spring weather has resulted in an unusual incidence of scab in susceptible varieties and in unsprayed and improperly protected orchards in western Oregon." In contrast to this statement we have that of Childs reporting from Hood River, Oregon, "Scab is not generally prevalent in the Hood River Valley, but in the upper Valley near Parkdale some orchards showed from 15 to 20 per cent fruit infection this year."

In California, another state reporting more scab than last year, Milbrath says, "A large amount of late infection. Hardly an orchard in state without some scab."

From Manitoba, Canada, Bisby reports, "More scab than usual."

Table 36. Relative prevalence of apple scab in 1925 compared with 1924 and average year.

State	Prevalence compared with		State	Prevalence compared with	
	1924	Average year		1924	Average year
New Hampshire	more	less	Indiana	less	less
Connecticut	same	same	Illinois	less	less
New York	more	----	Michigan	less	less
New Jersey	less	----	Wisconsin	less	less
Delaware	less	----	Minnesota	less	less
Maryland	less	----	Iowa	less	less
Virginia	less	less	South Dakota	same	same
West Virginia	less	less	Kansas	same	less
Tennessee	more	more	New Mexico	same	----
North Carolina	less	less	Idaho	----	less
Alabama	same	same	Washington	----	less
Oklahoma	less	less	Oregon	more	----
Arkansas	less	less	California	more	----
Ohio	less	----			

Losses

Naturally the losses resulting from scab in the United States were considerably less than last year. In spite of the fact that a few states report greater prevalence, the actual reported loss in yield is less. New York, which reported greater prevalence this year than in 1924, had a loss of only 10 per cent compared to 20 per cent in 1924. In the United States as a whole, the total apple crop was smaller than in 1924 by approximately

seven-and-a-half million bushels, while the commercial crop was approximately three-and-a-half million barrels larger. This is a significant fact, which may be explained partly at least, by a lighter toll taken by fungous diseases.

The data in table 37 indicates the losses from apple scab in all states reporting during the past eight years. The last line of this table, giving the losses for the United States, is probably the most significant and indicates a yearly alternation of high and low scab losses. During the period recorded, there have not been two successive years of high losses. The weather, particularly rainfall, from the prepink until the 5-week spray is probably the most important single factor in the determination of scab prevalence in any particular year, unless a typical late infection occurs, as reported in Minnesota and New York this year. However, late infections are rarely as severe and injurious as the early type.

A digest of all the reports on scab for 1925 would seem to indicate that losses were minor in properly sprayed orchards. The disease was easily controllable because of weather conditions adverse to the fungus. The heaviest losses this year were due to late infection.

Weather in relation to scab in 1925

Weather conditions, as previously remarked, were unfavorable to scab development in 1925. In the Eastern United States the reports are very similar and mostly to the effect that conditions for initial infection were slightly unfavorable but that drought following the blooming period effectively reduced primary and secondary infection. In Massachusetts the spring was dry, while July was wet. Delaware reports subnormal rainfall and above-normal temperature. Similar conditions prevailed in Virginia, North Carolina, Georgia, and all of the lower Appalachian Highland section. In Arkansas the weather was very dry. In the states of Ohio, Indiana, Illinois, Michigan, Minnesota, Iowa, Kansas, and South Dakota the early growing season, particularly April and May, was very dry and warm thus preventing to a large extent the normal initial infection.

In contrast to the above mentioned conditions, we have the long-continued, cool, wet, spring weather in Oregon. In New York, according to D. D. Ward, in the New York College of Agriculture Weekly News Letter, June 22, (Onandaga County) - "Some apple scab injury on foliage is showing as a result of the rainy period just at the close of blossoming. Very little of the Calyx application was applied prior to the rain."

Anderson (Illinois) reports on July 1, as follows, "May 15 was the date when scab was first observed at Urbana. Practically no scab in southern end of state on account of extremely dry spring. Lightest infection ever known."

Bennett (Michigan) under date of September 1 says, "The dry weather has almost completely held scab in check. There is very little fruit infection on unsprayed trees. Considerable late infection is now showing up."

According to Vaughan (Wisconsin), "Early infection much less than usual. This is associated with the extended drought of May. Extremely contrasting conditions prevailed in 1924 and 1925."

Schneiderhan reporting from Virginia says, "The total rainfall for April, May, and June, 1925, was 7.59 inches. Last year it was 18.16 inches. Approximately 70 per cent of the total annual ascospore discharge in 1925 occurred in April, too early for normal infection. A light initial scab infection resulted in practically no secondary infection because of the extremely dry weather in May, June, and July. The year 1925 was most unfavorable for fungous development."

Table 37. The percentage of reduction in yield due to apple scab in the United States for the period 1918 to 1925 inclusive.

State	Percentage reduction in yield due to apple scab								
	1918	1919	1920	1921	1922	1923	1924	1925	Average
Me.	-	+	8.	-	-	-	-	5.	6.5
N. H.	t	5.	10.	-	15.	1.	1.	2.	4.8
Vt.	-	5.	7.	2.	6.	5.	3.	2.	4.2
Mass.	t	1.	7.	-	5.	1.	5.	-	3.1
R. I.	-	2.	3.	-	-	2.	-	-	2.3
Conn.	0.5	2.	3.	12.	5.	3.	3.	2.5	3.6
N. Y.	5.	10.	5.	5.	22.	5.	20.	10.	10.2
N. J.	2.	-	5.	3.	-	0.5	12.	4.	3.6
Pa.	6.	10.	6.	15.	30.	4.	15.	-	12.3
Del.	-	5.	5.	2.	2.	3.	10.	5.	4.6
Md.	t	4.	3.5	4.	4.	3.	3.5	2.	3.
Va.	2	4.	4.	4.	15.	3.	18.	4.	6.7
W. Va.	t	3.	8.	5.	6.	1.	6.	2.	3.8
N. C.	-	4.	10.	-	-	8.	7.	3.	6.4
S. C.	1.	1.	5.	-	t	1.	1.	t	1.2
Ga.	1.	1.5	5.	5.	6.	3.	6.	1.	3.5
Fla.	-	-	-	-	-	-	-	-	-
Ohio	-	4.	5.	8.	8.	6.	10.	0.5	5.9
Ind.	-	3.	3.	3.	5.	4.	4.	1.	3.4
Ill.	4.	6.	8.	12.	7.	3.5	2.5	0.5	5.4
Mich.	5.	8.	8.	2.	16.	1.	12.	2.	6.8
Wis.	5.	8.	7.	5.	5.	2.	15.	5.	6.5
Minn.	.5	5.	8.	1.	5.	3.	3.	t	3.2
Iowa	3.	4.	4.	10.	10.	7.	10.	2.5	6.3
Mo.	2.	3.	5.	5.	-	-	-	-	3.7
N. D.	-	-	2.	-	2.	1.	1.	-	1.5
S. D.	-	8.	15.	-	2.	-	4.5	3.	6.5
Nebr.	-	8.	5.	-	-	-	5.	1.	4.7
Kans.	t	8.	7.	1.	5.	1.5	1.5	0.5	3.1
Ky.	5.	-	10.	-	3.5	30.	20.	10.	13.1
Tenn.	5.	10.	20.	t	12.	2.	1.	10.	7.5
Ala.	t	4.	3.	-	-	4.	2.	3.	2.6
Miss.	-	t	1.5	t	-	t	t	-	0.3
La.	-	t	-	-	-	-	-	-	+
Texas	-	-	0	0	-	-	0	0	-
Okla.	0	t	5.	1.	-	-	5.	-	2.7
Ark.	2.	0.5	2.	t	0.5	0.5	t	t	0.7
Mont.	t	t	2.	1.	-	-	t	-	0.6
Wyo.	-	-	-	-	-	-	-	-	-
Colo.	t	t	-	-	-	-	0	t	+
N. Mex.	-	0	-	-	-	-	2.	2.	2.
Ariz.	-	0	-	-	-	-	0	-	-
Utah	-	-	0	-	-	-	-	-	-
Nev.	-	-	0	-	-	-	-	-	-
Ida.	-	0.2	0.5	1.	t	0.5	t	t	0.3
Wash.	t	0.5	0.2	8.	0.3	0.5	t	t	1.2
Oreg.	2.	2.	15.	15.	5.	-	t	2.5	5.9
Calif.	-	-	0.5	-	-	-	-	4.	2.2
U. S.	2.5	3.93	6.	5.7	11.1	3.12	8.83	3.34	5.55

Data on ascospore emission

It has been generally recognized, particularly during the past six years as a result of special studies correlating ascospore emission with infection, that the time of first emission and the period of maximal emission of ascospores are probably two of the most important factors in the determination of an epiphytotic of scab in any particular year. Comparing such northern apple producing sections as Wisconsin, Michigan, and New York with the more southern ones of Delaware, Maryland, Virginia, and West Virginia we find a different correlation between initial ascospore emissions and vegetative advancement of the tree. It is apparent that ascospores begin to discharge in these northern states when the trees have advanced comparatively little from dormancy, while in the other states mentioned, first ascospore emissions usually occur just previous to and during the pink and blooming period. The result in the North is that the delayed dormant or prepink sprays are of relatively greater importance for scab control than in the states farther South.

Wisconsin: According to Keitt and Wilson (13) conditions affecting the abundance of ascospores of Venturia inaequalis and the time of their maturity and discharge are of much potential importance in relation to the development and prevention of epidemics of apple scab. A marked relationship was observed between the time of leaf fall and ascospore maturity. Under conditions studied, ascospores matured much earlier in leaves which fell in the early autumn than in those which remained on the tree until late autumn or early winter. Temperature and moisture were shown to be factors of cardinal importance in determining the rate of development of ascocarps.

The work of Frey and Keitt (7) shows periodicity of ascospore discharge in 1917. The presence of an adequate amount of water was the most important requisite for spore discharge. Wetting by dew did not cause discharge. Conidia of the scab fungus were found in the air only during rainy periods particularly when rains were accompanied by strong wind.

Delaware: Adams (1) showed that the prevalence of the disease was found to be associated with ascospore discharge depending upon weather conditions. The heavier infection in Sussex County was found to be correlated with earlier maturity and discharge of ascospores.

Virginia: Four years of investigation at Winchester have enabled us to determine the relative control values of the so-called scab sprays. The pink and petal-fall sprays are the most important and account for approximately 80 per cent of the total control value. The 10-day spray is valued at 10 per cent and all of the remaining sprays at 10 per cent. Control values of scab sprays are correlated with ascospore ejection. The pink and petal-fall sprays are most valuable because approximately 60 per cent of all ascospore ejections are intercepted or nullified by these sprays. (Schneiderhan)

As a result of a request for special ascospore ejection data it was possible to prepare the following tables. If the same states would contribute similar data for several years, a much more comprehensive knowledge of the regional behavior of ascospore emission would result. It is suggested that these and additional states report such or similar data next year.

New York: During May, 1924 the rainfall was 4.5 inches. In 1925 it was 1.3 inches. The railroad estimate for scab-free fruit for 1924 was 46 per cent; for 1925 it was 75 per cent. Most of our scab in 1925 came late, following a late primary infection. (Massey)

Table 38. The dates of ascospore discharge, rainfall causing them, and the dates of spray application, Wayne County, New York, 1925.

Date of discharge	Rainfall (inches)	Date of spray application
May 1	.15	Delayed dormant, April 24
May 4	.30	1st pre-blossom, May 8
May 6	.15	2nd pre-blossom, May 16
May 10	.05	Calyx, May 28
May 16	.25	1st cover, June 19
May 23	.25	- - - - -
June 1	.25	- - - - -

Table 39. Dates of ascospore discharges, the extent of discharge together with rainfall causing them, and dates of spray application, New Brunswick, New Jersey, 1925.

Date	Rainfall (inches)	Spore discharge	Spray application
April 15	1.06	-	-
April 17	-	-	Pink
April 18	0.03	-	-
April 19	0.03	-	-
April 25	t	-	-
April 26	0.04	-	-
April 28	0.19	Medium	-
April 29	0.10	Medium	-
April 30	0.46	Heavy	-
May 1	0.05	Light	-
May 3	-	Light	-
May 5	0.02	Light	Petal-fall
May 6	t	Light	-
May 7	-	Light	-
May 10	0.02	-	-
May 11	1.15	Medium	-
May 12	0.01	-	7-day

Date	Rainfall (inches)	Spore discharge	Spray application
May 22	-	-	17-day
May 24	0.49	Medium	-
May 25	0.52	Light	-
May 26	-	-	-
May 27	-	Light	-
May 29	0.29	-	-
May 30	0.39	Medium	-
June 10	t	Light	-
June 14	t	Medium	-
June 16	0.14	Medium	-
June 18	t	Medium	-
June 21	t	-	-
June 22	t	-	-
June 23	0.03	-	-
June 25	0.07	-	-
June 27	t	-	-
June 28	0.04	-	-
June 30	1.39	-	-

Similar data for Moorestown show that the first spore discharge occurred on April 25. First scab infection occurred at Vineland, May 15. (Martin)

Table 40. Ascospore ejection data, Winchester, Virginia, 1925.

Date	Rainfall (inches)	Spore ejection	Spray application
April 10	.04	Light	Delayed dormant, March 26
April 14	.50	Heavy	Pink, April 12-16
April 17	.10	Light	- - -
April 23	.10	Heavy	- - -
April 25	.98	Very heavy	- - -
April 26	.10	Light	Petal-fall, April 27
April 28	.45	Heavy	- - -
April 29	.38	Light	- - -
April 30	.59	Medium	- - -
May 4	.40	Light	- - -
May 5	.08	Light	10-day, May 11
May 22	.74	Light	- - -
May 29	.19	None	4-weeks, May 29

First scab appearance May 10.
Most important spray - Pink.
Unusually short ascospore discharge period of 31 days. In 1922 it was 56 days; 1923, 94 days; and 1924, 61 days.

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Table 41 indicates the importance of ascospore ejections of May in Virginia. A striking correlation exists between rainfall causing ascospore discharges in May and yearly infection.

Table 41. A four-year summary showing correlation of ascospore ejection with rainfall and scab infection on unsprayed Stayman fruits at Winchester, Virginia.

Year	Number of ejections and rainfall				Total ejections	Total rain (inches)	Total period (days)	Scab infection (per cent)
	April	May	June	July				
1922	4(1.30)*	9(3.63)	3(4.01)	0	16	9.94	56	95.5
1923	1(2.93)	4(1.12)	5(1.94)	3(3.35)	13	9.34	94	2.2
1924	3(1.70)	7(10.75)	4(5.71)	0	14	18.16	61	81.9
1925	9(3.30)	4(2.47)	0(1.82)	0	13	7.59	31	6.5

*Rainfall (inches) in parentheses. (Schneiderhan)

Scab development in Wisconsin was not sufficient to give a satisfactory test of the various fungicidal programs used.

Table 42. Dates of ascospore discharges correlated with rainfall and spray applications, Sturgeon Bay, Wisconsin, 1925.

Dates of discharge	Rainfall in inches	Spray application
April 26	trace	Delayed dormant
April 29	trace	- - -
May 4	0.03*	- - -
May 5	0.01	- - -
May 6	0.05	Pre-pink
May 11	0.01	- - -
May 13	0.01	- - -
May 14	trace	- - -
May 16	0.09	- - -
May 17	0.39	Pink
May 21	0.59	- - -
May 24	0.08	- - -
May 28	0.13	- - -
May 29	0.00	- - -
June 2	0.08	Calyx
June 4	0.26	- - -
June 5	0.02	- - -
June 12	0.36	- - -
June 13	1.45	10-day
June 14	0.17	- - -
June 15	0.61	- - -
June 17	0.04	- - -
June 26	0.06	- - -
June 27	0.09	- - -

Dates of discharge	Rainfall in inches	Spray application
June 29	0.01	- - -
July 2	0.27	- - -
July 3	0.09	- - -
July 4	0.01	- - -
July 7	0.13	- - -
July 9	0.46	- - -
July 12	0.13	- - -

* Largest number discharged this date. The heaviest discharges of the season took place between May 3 and May 30. (Keitt & Wilson)

Maryland: The following abstract was prepared from a paper by Jehle and Hunter entitled "Factors in Scab Development" read before the Maryland State Horticultural Society:

"Leaves containing perithecia of the apple scab fungus were placed in moist chambers in a greenhouse and outside. Temperature records were kept in both locations. In the greenhouse the minimum temperature was 35° F., the maximum 90°, and the average was approximately 60°. The minimum temperature outside was 13°, the maximum 77°, and the average 45°. The first ascospore discharge in the greenhouse occurred 25 days after the leaves were placed in the moist chamber. Under outside conditions the first discharge occurred 26 days after exposing the leaves. Under the conditions of this experiment, it would seem that comparatively high temperatures do not increase the rate of ascospore development and that they develop just as rapidly at an average temperature of 40° as they do at an average temperature of 60°."

West Virginia: The data on ascospore discharge for Jefferson and Berkeley Counties, West Virginia, are practically the same as for Winchester. A letter from E. C. Sherwood, (West Virginia) to F. J. Schneiderhan, (Virginia), under date of January 11, 1925, states, "You may know, however, that your data at Winchester correspond exactly with my field notes. I remember checking them with your records at the time I visited your laboratory. You have my authority, therefore, for using your own, (Winchester), notes as typical of our conditions in that section." (Sherwood)

Pennsylvania: The dates of first ascospore ejection in Pennsylvania in 1925 were as follows:

April 16-17	Bedford and Alleghany Counties
April 19	Philadelphia and Delaware Counties

April 21 Center County
April 28 First heavy discharge in Center County
April 30 Franklin and Venango County

You will note from these dates that conditions in Pennsylvania are far from uniform. The most important spray for scab control varies with the region of the state under consideration. In some regions this was the delayed dormant and in others as late as the pink. (Thurston)

Tennessee: First ascospore discharge at Knoxville was on March 28. This was not general. On April 12 an abundant discharge occurred. The dates of spray application were: delayed dormant, March 10; pre-pink, March 18; pink, March 24; calyx, April 16; 10-day, April 26; five-week, latter part of May. Period of heaviest discharge was just prior to April 12. The most important scab spray was the pink spray. First scab appearance May 15. (Andes)

Illinois: No data on period of heaviest ascospore ejection but probably no discharge at all to speak of. I collected leaves containing perithecia here at Urbana early in April and found they would discharge spores when moistened, but we did not have sufficient rains following the maturing of the ascospores to bring about discharge. (Anderson)

Minnesota: Apple scab, ordinarily considered to be one of the most injurious diseases of apples in Minnesota, was of negligible importance, even in unsprayed orchards, during the season of 1925. Primary infection spots, which usually appear on the leaves about the middle of May, were not reported until the middle of June and then only a few were found. No scab was reported on the fruit at any time during the summer and very little appeared on the leaves until late fall, at which time secondary infection spots became quite abundant. The slow start of apple scab and its failure to spread until late fall was undoubtedly due to weather conditions. Usually, ripe perithecia are abundant shortly after the first of May and before the leaf buds are open. Ripe perithecia, in the past season, were very scarce up to the middle of May, probably because of the extremely dry weather during April and the early part of May. At no time were perithecia abundant. (Sect. Pl. Path.)

The following information was reported by Peterson of the Section of Plant Pathology, University of Minnesota.

Table 43. The probable dates of ascospore discharges in Minnesota in relation to dates of spray applications in 1925.

Date	Rainfall (inches)	Probable spore discharges	Spray dates
May 11	.05	Probably first spore discharge	Dormant, April 27

Date	Rainfall (inches)	Probable spore discharges	Spray dates
May 15	.25	Probably period	Pink, May 1
May 16	.25	of heaviest dis-	
May 19	1.00	charge	Calyx, May 20
June 1	.05	Probably some dis-	10-day, May 31
June 2	.07	charge at these	
		dates	

First primary infection noted June 20.
No 5-week sprays applied.
Results: No scab in sprayed plots or in checks.

Dates of first appearance of scab in 1925

The variation in the dates of first appearance of scab within any particular state from year to year may be wide. Considering an area as large as the United States with the disease occurring in every state, this variation is still greater. In 1925 the earliest appearance of scab was noted on April 17 in Delaware (Adams). The latest initial infection by scab was observed on June 22 in New Hampshire (Butler). In Minnesota, as reported by the Section of Plant Pathology, "In the Twin Cities region and southern part of the state, primary infections apparently took place about June 1 which is approximately one month late for Minnesota."

In view of the fact that scab infection through the season may occur in several distinct cycles, as reported in Virginia and recorded on page 6 of the 1924 Supplement, the importance of the date of initial appearance may not be very great in any particular year. A more important consideration in describing an epiphytotic of scab is the date of maximal appearance which depends largely upon the periodicity of rainfall, the chief causative factor of primary and secondary infection. It is true that the extent of primary infection has an important bearing on secondary and total yearly infection, but the date of first appearance of scab may not be, and usually is not, at the peak of the primary infection cycle. We need more data from the various states relative to the seasonal behavior of the scab fungus following initial infection.

In New York, according to Bucholz, "There was very little infection early in the season. In fact it was not noticed very much before summer. With rainy periods in July, scab began to be apparent and by September a considerable percentage developed."

Dates and location of earliest reported appearance of scab, 1925

April 17	Seaford	Delaware	May 18	Dutchess Co.	New York
May 10	Winchester	Virginia	May 26	Orono	Maine
May 10	Berkeley Co.	West Virginia	May 28	Amherst	Massachusetts
May 13	Milford	Connecticut	June 4	Burke Co.	North Carolina
May 15	Vineland	New Jersey	June 11	St. Paul	Minnesota
May 15	Vincennes	Indiana	June 22	Durham	New Hampshire
May 15	Urbana	Illinois			

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Of the states reporting dates of first appearance of scab, seven reported later, five earlier, and one the same date as in 1924.

Varietal susceptibility

The data on varietal susceptibility contributed by the collaborators this year were very fragmentary and, therefore, impossible of compilation in a representative manner. The same criticism was made for the 1924 data. The question of varietal susceptibility to scab is an important one. An examination of the data presented during the past eight years shows wide differences. For instance, in 1925 Jonathan was reported as very susceptible in New Mexico, while in Virginia this variety is known to be fairly resistant. Other examples could be cited.

Control

From a country-wide standpoint apple scab was easily controlled by proper spraying in 1925. The data presented by the collaborators indicate that wherever the pre-pink, pink, petal-fall, and 10-day spray were carefully applied, scab control was very satisfactory, except where late-season infection occurred.

The following reports indicate in a brief manner the scab control status in 1925.

Maine: Unsprayed Ben Davis plot showed 11 per cent of leaves infected and 1 per cent of fruit. In nearby commercial Ben Davis orchards, sprayed four times, no scab was seen. Nearby unsprayed Ben Davis commercial orchards up to 45 per cent scab on fruits. McIntosh sprayed five times, trace on fruits. No twig infection on trees. Nearby commercial orchards of McIntosh up to 96 per cent scab; sprayed five times, up to 85 per cent scab. (Folsom)

Massachusetts: Continued wet weather during July has greatly increased secondary infection especially where the usual spray schedule was not closely followed. (Osmun & Davis)

New York: The most important sprays happened to be the calyx in Ontario a Genesee Counties, and pink along the Lake region, that is, in Niagara, Orleans, Monroe, and Wayne Counties. (Massey)

Delaware: Mostly leaf infection. Only slight fruit infection in unsprayed orchards. (Adams)

Maryland: Showing up on all unsprayed or poorly sprayed trees on leaves and fruits. None noted on twigs as was the case last year. Not so bad as last year. (Jehle)

Virginia: Scab was easily controlled in 1925. Favorable weather conditions for both ascospore ejection and infection occurred between the pink, petal-fall, and 10-day spray but the unprecedented drought checked the spread of the disease. There was practically no secondary scab infection in northern Virginia in 1925. (Fromme & Schneiderhan)

Ohio: Of minor importance this year where any type of spraying or dusting has been done. Weather conditions were not favorable for its development. (Young)

Indiana: Not serious except in unsprayed trees. (Gardner)

Illinois: The season started with unusually high temperatures. This resulted in practically the entire absence of the pre-bloom infection of apple scab. I examined hundreds of trees for scab where in previous years one could not glance at a tree without seeing scab spots, yet this season I was able to find but a very few infections. I am of the opinion that there has never been a season more unfavorable for apple scab. (Anderson)

Michigan: There is very little fruit infection on unsprayed trees. Considerable late leaf infection is now showing up. (Bennett)

Missouri: Heavy loss in unsprayed orchards in Dallas, Green, and Polk Counties. (Maneval)

Oregon: Five scab sprays with dry lime-sulfur or lime-sulfur followed by sulfur at calyx, 15 days, and 30 days applied. Bad weather conditions mainly responsible for severity. In Lane County according to Fruit Inspector C. E. Stewart, loss was total on unsprayed trees in many cases; and in some cases 15 to 35 per cent in sprayed orchards. (Barss)

According to a letter from Childs (Hood River), "In years past we have found that no particular spray is the most important one; this importance varying with seasonal conditions. On the average, I believe the delayed dormant and pink applications are the most important considering the climatic conditions in this area."

For the control of apple scab in scabby orchards Butler (8) recommends a pre-pink, pink, and calyx spray of Bordeaux mixture 2-2-50, and a 14-day with lime sulfur 1-50.

Recent literature

1. Adams, J. F. The spore discharge of the apple scab fungus in Delaware. Delaware Agr. Exp. Sta. Bul. 140: 3-16. 1925.

2. _____ and T. F. Manns. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.
Notes on the value of casein compounds in connection with orchard spraying.

3. Anderson, H. W. Apple and pear scab and apple blotch. Trans. Illinois Sta. Hort. Soc. 58 (1920): 264-370. 1925.

4. Bagenal, N. B., W. Goodwin, E. S. Salmon, and W. M. Ware. Spraying experiments against apple scab. Jour. Min. Agr. Great Britain 32: 137-149. May 1925.
Working on the susceptible variety Bismarck in England, they

found scab lesions on leaves before blossom opening necessitating the application of a pre-pink spray. Bordeaux mixture (8-8-100) and lime sulfur (1 -29) produced the best results. Lime-sulfur caused dropping of young fruits while Bordeaux mixture did not.

5. Ballou, F. H. and I. P. Lewis. Spraying for apple scab and apple blotch. Ohio Agr. Exp. Stat. Monthl. Bul. 10: 50-52. Mar.-Apr. 1925.

6. Birmingham, W. A. Experiments for the control of black spot of apple due to the fungus Venturia inaequalis (Cke) Aderh. Agr. Gaz. New South Wales 37: 665-666. Sept. 1925.

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9. Doran, W. L. Experiments on the control of apple scab and black rot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 1-10. 1925.
Primary infection of leaves was prevented equally well by lime-sulfur solution, Bordeaux mixture, and dry-mix sulfur-lime. The addition of calcium caseinate spreader to a lime-sulfur and lead arsenate spray did not result in increased protection against scab.

10. Frey, C. N. The cytology and physiology of Venturia inaequalis (Cke.) Wint. Trans. Wisconsin Acad. Sci. 21: 303-343. 1924.
Experiments thus far performed show that the minimal temperature for infection is not more than 6° C. and the maximal not less than 26° C. It is probable that further work will extend the lower temperature limit. The optimal temperature for infection was near 20° C. which agrees closely with the optimum for germination of ascospores and growth of Venturia inaequalis.

11. _____ and G. W. Keitt. Studies of spore dissemination of Venturia inaequalis (Cke.) Wint. in relation to seasonal development of apple scab. Jour. Agr. Res. 30: 527-540. 1925.

12. Keitt, G. W. Studies of apple scab infection under controlled conditions. (Abstract) Phytopath. 16: 77. Jan. 1926.

13. _____ and E. E. Wilson. Studies on the development of the ascigerous stage of Venturia inaequalis in nature. (Abstract) Phytopath. 16: 77. Jan. 1926.

14. Kendall, J. C. Toxicity of fungicides to parasitic fungi. In New Hampshire Agr. Exp. Sta. Bul. 216 (Rept. Director 1924): 8-9. 1925.
Doran (9) carried on experiments to determine the effect on

spores of adding arsenious oxide, lead arsenate and calcium arsenate to lime-sulfur solutions. It is reported that lead arsenate through its decomposition, and arsenious oxide increased the toxicity of the solutions but the addition of calcium arsenate only slightly decreased the percentage of spore germination.

15. Salmon, E. S., and W. M. Ware. Biological observations on apple "scab" or "black spot". Jour. Pomol. and Hort. Sci. 4: 230-249. June 1925.

16. Schenk, P. J. Appel- en pereschurft. Floralia 46: 244-245. Apr. 17, 1925.

17. Stover, W. G. Apple scab costs Ohio 750,000 bushels a year. Agr. Student Ohio Univ. 31: 184-185. Apr. 1925.

18. Thomas, P. H. Black spot control. Tasmania Dept. Agr. Fruit Div. Bul. 116: 1-6. 1925.

19. _____ Black spot control. Fruit, Flower & Veg. Trades Journ. 48: 234-235. Aug. 29, 1925.

20. Whetzel, H. H. The story of the apple scab and its control. Proc. New York State Hort. Soc. 70: 159-162. 1925.

21. Young, H. C. and R. C. Walton. Spray injury to apple. Phytopath. 15: 405-415. 1925.

BLOTCH CAUSED BY PHYLLOSTICTA SOLITARIA ELL. & EV.

Geographic distribution

As in previous years the distribution of blotch was limited largely to states south of the 42° of latitude. Most of the reports for 1925 came from east of the Mississippi. A total of twelve reports was received from east of the Mississippi and only one west of it.

Relative prevalence

Considering the country as a whole blotch was considerably less prevalent in 1925 than in 1924 and the average year. Comparing the 1925 prevalence with that of 1924, only Ohio and Tennessee reported more, while Kentucky, Illinois, Indiana, Kansas, West Virginia, Virginia, Delaware, Maryland, and New Jersey reported less. Wisconsin and Alabama reported the same as in 1924. A comparison of the 1925 prevalence with normal shows that no state reported more than normal this year, while the majority of collaborators reported less. Normal prevalence was reported from Maryland, New Jersey, Tennessee, Wisconsin, and Alabama.

APPLE - Blotch

Losses

Losses from blotch for 1925 were a minor consideration in fruit production, the data indicating that they were considerably below normal, and since the apple crops in the blotch areas were smaller than usual the total aggregate loss in the United States was comparatively slight.

Table 44. Estimated losses from blotch as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Alabama	1	Maryland, Indiana, Illinois, Arkansas
4	Kansas, Kentucky	.75	New Jersey
3	North Carolina, Iowa, Tennessee, Mississippi	trace	Delaware, Virginia, West Virginia, South Dakota, Nebraska
2	Ohio, Texas		

West Virginia: Much more than usual on Ben Davis in Berkeley and Jefferson Counties. (Sherwood)

Virginia: As prevalent as usual in infested orchards but not checked by the drouth as scab and other diseases. (Fromme)

Oklahoma: This is probably the worst disease of the fruit, affecting fully 60 per cent of the fruit of Missouri Pippin and Ben Davis in unsprayed orchards. (Rolfs)

Arkansas: Very little in principal apple section in Washington and Benton Counties. Common at lower altitudes in central and southern parts where little spraying is done. (Young)

Ohio: Blotch is more general throughout the southern part of the state than it has been for several years and is causing considerable loss. (Young)

Illinois: Blotch was very late appearing due to dry weather and when it finally appeared the few primary infections were not numerous enough to cause loss. (Anderson)

Weather relations

The lack of normal rainfall appears to be the most important factor inhibiting the disease this year. This lack of rainfall prevented the normal exudation of spores from the cankered twigs, resulting in a minimum of infection. Young of Ohio reports, "Unfavorable temperature relations." Gardner of Indiana says, "Hot, dry April and May unfavorable." Anderson of Illinois reports, "An extremely dry spring resulted in almost complete control of apple blotch.

APPLE - Blotch

Dates and location of earliest reported appearance of blotch, 1925

April	Franklin Co.	Kentucky	June 11	Lawrence	Indiana
May 18	Pulaski	Illinois	June 15	Holmdel	New Jersey
June	Lexington	Kentucky	October 6	Wild Rose	Wisconsin
June 5	Crozet	Virginia			

Spore emergence and infection data

New Jersey: Thirty apples were bagged each week starting May 18 and continuing until June 30. On unbagged apples first infection was observed on June 22. All apples bagged on May 18 were clean. Of those bagged May 26, 1.1 per cent showed blotch, those bagged June 1 showed 0.83 per cent blotch, while 50 per cent of the fruit bagged on June 8 was infected. Most of the apples bagged after this date showed heavy infection. In this orchard the 17-day application was made on May 26 and the 28-day spray, June 24. (Martin)

Virginia: First fruit lesions noted at Crozet June 5 and at Winchester June 12. Records of exudation of conidia from twig cankers obtained at both Crozet and Winchester to date are as follows:

Crozet	Winchester
May 24	May 24
June 6	June 7
June 24	June 18
June 27	June 24
- - -	July 4

(Fromme)

Varietal susceptibility

The data on varietal susceptibility was not specific enough to compile a table. We shall, therefore, quote the collaborators.

New Jersey: Most severe on Smith Cider. Found on Alexander. (Martin)

Wisconsin: Most noticeable on Northwest Greening and an unnamed yellow sweet apple. (Vaughan)

Virginia: The only susceptible varieties found in Virginia are Northwestern Greening, Ben Davis, and Limber Twig. (Schneiderhan)

Tennessee: Most serious on Dutchess, Early Harvest, and Ben Davis. Not serious where thoroughly sprayed. (McClintock)
In nursery. Early varieties most susceptible. (Fackler)

An interesting report on varietal susceptibility for 1925 was that of Gardner. He says:

"The most recent discovery is that of the presence of apple blotch cankers on French-grown seedlings. This at once raises a question as to whether or not this disease occurs in France."

Quoting the same collaborator further:

> "In addition to previous records, fruit infection has been found on Baldwin and on twigs and fruit of Cortlandt. We have found blotch on seven nurseries in southern Indiana, on Kansas grown seedlings and on French seedlings in one nursery."

Blotch control

Control data were reported from Virginia by Schneiderhan and from New Jersey by Martin.

It is apparent that in the New Jersey experiment, block 3, sprayed with 1-40 lime-sulfur, two and three weeks after petal fall, and with Bordeaux, four and six weeks after petal-fall, produced the best results.

Table 45. Blotch control results in New Jersey, 1925.

Block	Clean per cent	Salable per cent	Unsalable per cent
1 .....Pick	77.6	19.5	2.9
Drop	66.1	10.1	23.9
2 .....Pick	80.5	16.4	--
Drop	--	--	--
3 .....Pick	86.3	12.1	1.6
Drop	79.3	9.4	11.3
4 .....Pick	48.1	30.2	21.7
Drop	54.4	12.8	32.8
Check .....Pick	11.5	30.8	57.7
Drop	8.2	3.7	88.1

All except the check plot received the delayed dormant, pink, petal-fall, and 7-day applications of 1 to 40 lime sulfur. Block 1 received also an application of 1 to 40 lime-sulfur at 17 days and 2-4-50 Bordeaux mixture 4 and 6 weeks after petal-fall. Block 2 treated in a similar manner was given an additional application of Bordeaux mixture 8 weeks after petal-fall. Block 3 received 1 to 40 lime-sulfur 2 and 3 weeks after petal-fall, the 17-day spray being omitted, and then received applications of Bordeaux 4 and 6 weeks after petal-fall as in the case of block 1. Block 4 was sprayed with lime-sulfur 17 days and 4 and 6 weeks after petal-fall. (Martin)

In Virginia the relative control values of the three important blotch sprays were determined. The program of sprays was as follows: Ten days after petal-fall (lime-sulfur 1 to 40); four weeks (Bordeaux, 3-5-50); seven weeks (Bordeaux 3-5-50). Of the four plots used, one received all of the sprays and in each of the other plots one spray was omitted which enabled us to check the control effected against the full program. In a fifth plot, dry-mix sulfur-lime was applied three times. The control data follow:

Table 46. The relative values of three blotch sprays on Northwestern Greening fruit at Winchester, Virginia, 1925.

Plot	Spray omitted	Blotch-free fruit (per cent)	Number of fruits examined
1	10-day (May 15)	92.7	5691
2	4-week (June 2)	59.4	2453
3	7-week (June 29)	94.0	3454
4	None (full program)	95.9	3168
5	Full program (Dry-mix only)	78.4	7276
Check		34.2	4682

1. Four weeks spray most important for blotch control in 1925.
2. Dry-mix sulfur-lime not as effective as lime-sulfur and Bordeaux this year.
3. Value of four weeks spray is correlated with conidial exudation. It was the most important blotch spray because it nullified approximately 58 per cent of total conidial exudations. (Schneiderhan)

Delaware: Trees with twig infection carefully sprayed with Bordeaux showed no fruit infection. Dry weather against prevalence of the disease this year. (Adams)

Indiana: Spraying at petal-fall two, four, and six weeks gave good control on Dutchess and Ben Davis in southern Indiana. Bordeaux mixture 2-4-50 and lime-sulfur 1 to 40 effective. Blotch was not at all difficult to control this season. Canker eradication in young orchards gives excellent promise of complete elimination of the disease with indications that special blotch sprays may be omitted by the fourth year after the cankers are removed. (Gardner)

Guba (2), (Illinois) for the control of apple blotch, recommends pruning and spraying. All pruning should be done prior to the application of the dormant spray. For the dormant spray, commercial lime-sulfur 1 to 8 or copper sulfate 1 to 10 is recommended. The dormant spray is to be followed with two applications of lime-sulfur at intervals of two to three weeks after petal-fall followed by three or four applications of Bordeaux mixture.

According to Ballou and Lewis (1)

"The three-year average per cent of sound blotch-free fruit produced on the seven plots on which Bordeaux of different strength was used are 97.8, 98.9, 99.1, 98.7, 99.3, 99.7, and 100 respectively. The first plot, 97.8 per cent, was sprayed with 0.75-2.25-50 Bordeaux; the last, 100 percent, with 2-6-50 Bordeaux. The three-year average for the unsprayed check plot is 14.7 per cent. The five lime-sulfur plots gave three year averages of 93.4, 96.7, 98.1, 98.5, and 99.5 per cent respectively."

APPLE - Blotch

McClintock and Sherbakoff (4) recommend that for blotch control on early apples at least four summer sprays be applied beginning with the calyx spray and following at intervals of two weeks. Either lime-sulfur or Bordeaux if thoroughly applied should control blotch.

Recent literature on blotch

1. Ballou, F. H. and I. P. Lewis. Spraying for apple scab and apple blotch. Ohio Agr. Exp. Sta. Month. Bul. 10: 50-52. Mar.-Apr. 1925.

2. Guba, E. F. Phyllosticta leafspot, fruit blotch, and canker of the apple: Its etiology and control. Illinois Agr. Exp. Sta. Bul. 256: 481-557. 1925.

3. Hesler, L. R. Apple blotch control. Proc. Tennessee Hort. Soc. 19: 49-55. 1924.

4. McClintock, J. A., and C. D. Sherbakoff. Spraying early apples for blotch control. Tennessee Agr. Exp. Sta. Bul. 132: 1-8. 1925.

5. Martin, W. H. Plant diseases of New Jersey VIII. Blotch. A serious disease of the apple. New Jersey Agr. 7 (12): 10-11. Dec. 1925.

6. Thomas, H. E. Apple blotch in New York state. Phytopath. 15: 246-247. 1925.

7. Walton, R. C. Apple Blotch. Pennsylvania Agr. Exp. Sta. Bul. 196: 17-18. July 1925.

CEDAR RUST CAUSED BY GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE SCHW.

Geographic distribution

The geographic distribution of cedar rust as reported for 1925 was similar to other years. This, of course, is due to the peculiar nature of the disease and is determined very largely by the distribution of the red cedar. Cedar rust infection in 1925 was exceptionally light. Only three states reported greater prevalence than for 1924 or normal. These states are Iowa, Minnesota, and Kansas.

In Minnesota according to a letter from E. C. Stakman,

> "The explanation lies in the fact that we had tropical rains almost from June 1 to about June 20. There was a total of 4.75 inches of rain during June,..... There also were many minor showers, at least almost every day and sometimes several times a day. Not only that but there were rather heavy winds. The conditions, therefore, were ideal for the gelatinization of the cedar galls, for the germination of the teliospores and the distribution of sporidia."

Considering the fact that twenty-five states reported on cedar rust and that in most of them the disease was exceptionally slight, we conclude that 1925 was a year of comparatively slight infection for the country as a whole.

Table 47. Prevalence of cedar rust in 1925 compared with 1924 and with normal.

Compared to 1924			Compared to normal		
More	Less	Same	More	Less	Same
Minn.	Mass.	Conn.	Minn.	Mass.	Conn.
Iowa	Del.	Ala.	Iowa	Del.	Md.
Kans.	Md.	Mich.	Kans.	Va.	Ala.
--	Va.	Wis.	--	W. Va.	Mich.
--	W. Va.	S. D.	--	S. Car.	Wis.
--	S. Car.	N. Car.	--	Ark.	S. D.
--	Okla.	Tenn.	--	Ohio	N. Car.
--	Ark.	--	--	Ind.	Tenn.
--	Ohio	--	--	Ill.	--
--	Ind.	--	--	--	--
--	Ill.	--	--	--	--

Losses

The average loss from cedar rust in the United States for the six-year period, 1918-1924, inclusive was approximately 1 per cent. The loss in 1925 is considerably below that average. Even in states where cedar rust is usually of great importance, like Pennsylvania, West Virginia, Virginia, Maryland, and Ohio, the disease caused only slight damage in 1925.

Table 48. Estimated losses caused by cedar rust in the United States in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	Iowa	trace	Maine, New Hampshire,
3	Virginia		Massachusetts, Rhode
1.5	North Carolina		Island, Connecticut, New
1	New York, West Virginia, South Dakota		Jersey, Delaware, South Carolina, Ohio, Indiana,
.5	Connecticut, Maryland, Minnesota, Kansas, Tennessee, Arkansas		Illinois, Michigan, Wisconsin, Missouri, North Dakota, Nebraska, Kentucky Alabama, Mississippi Oklahoma

Massachusetts: Crabapple trees which have been highly infected with the disease bear very little this year. (Davis)

APPLE - Cedar rust

Connecticut: Little serious injury reported. (Stoddard & Hunt)

New York: Cedar rust on foliage is very heavy in some orchards of Rome Beauty, Wealthy, York Imperial, and Jonathan. (Wagoner)

Delaware: Considerable reduction in prevalence during the last two years. (Adams)

Virginia: Caused considerable injury in orchards subject to severe exposure of cedars but generally lighter than last year. (Fromme)

West Virginia: Much less this year than in 1924. (Giddings)

Tennessee: Some fruit spot and some serious leafspot and defoliation. (McClintock)

Oklahoma: Comparatively little damage caused by this organism during the present year. (Rolfs)

Arkansas: Much less than last year. Not enough to cause defoliation in any isolated cases. (Young)

Indiana: Light foliage infection; trace on fruit. Too dry in April and May. (Gardner)

Wisconsin: Rust has been observed as less than usual this year at Gays Mills. (Vaughan)

Minnesota: Considerable rust on apples has been found in certain localities particularly Albert Lea, Taylors Falls, and Fillmore County. (Sect. Plant Path.)

Missouri: There has been very little cedar rust this year. (Bregger)

Weather relations

With local exceptions, weather conditions in the United States for 1925 were very unfavorable to infection. The important factor, as in some other diseases was the absence of normal rainfall, which in the case of cedar rust is necessary for the protrusion of the teleosori and subsequent production of spores.

Spore discharges

The following data relating to spore development were received from J. F. Adams of Delaware:

"Telia maturing on cedars April 24. Pycnia on leaves of Early Ripe observed May 7. Very little infection observed to date (July 15) and considerable reduction in prevalence in last two years."

APPLE - Cedar rust

From Virginia, which has for years reported the greatest economic loss from cedar rust in the United States, the following statement concerning spore discharges was submitted.

> "A heavily infected small cedar tree planted in the laboratory grounds at Winchester was used for demonstration of infection and spore discharge. It was planted between two small York trees, one of which was covered with a muslin bag, the other uncovered. Defoliation to the extent of 80 per cent occurred June 15 on the uncovered tree. Removing the muslin bag July 19 revealed no infection on the covered tree. This demonstration of infection was used to good advantage as propaganda for cedar eradication campaigns."

Table 49. The dates and the nature of discharges of teliospores from cedar tree galls, together with rainfall in inches, Winchester, Virginia.

Date	Rainfall (inches)	Spore discharge	Date	Rainfall (inches)	Spore discharge
April 2	.06	Slight	May 5	.08	Slight
April 10	.04	Slight	May 10	.15	Medium
April 14	.50	Heavy	May 22	.74	Heavy
April 17	.10	Heavy	May 24	.91	Heavy
April 23	.10	Heavy	May 29	.19	Slight
April 25	.98	Heavy	June 7	.12	Medium
April 26	.10	Slight	June 8	.50	Medium
April 28	.45	Heavy	June 14	.15	Medium
April 29	.38	Heavy	June 18	.20	Medium
April 30	.59	Heavy	June 23	.48	Very slight
May 4	.40	Heavy			

(Schneiderhan)

Dates and locations of earliest reported appearance of cedar rust, 1925

May 7	Seaford	Delaware	June 11	North Stonington	Connecticut
May 11	Winchester	Virginia	June 11	Raleigh	North Carolina
May 20	Amherst	Massachusetts	June 11	Knox County	Indiana
May 25	Springhill	Tennessee	June 23	Kandiyohi County	Minnesota
June 8	Orange County	New York	July 7	Shiloh	New Jersey
June 9	Clemson College	South Carolina	July 20	Darlington	Wisconsin

Varietal susceptibility

New York, Ulster County: On Rome Beauty, Wealthy, York Imperial, and Jonathan. (Chupp)

New Jersey: Found on Star. (Martin)

Virginia: Susceptible varieties in Virginia are Rome Beauty, York Imperial, Jonathan, and Ben Davis. (Fromme)

APPLE - Cedar rust

Tennessee: Less on Transparent, more on Early Ripe and Early Harvest. (McClintock)

Wisconsin: Confined mostly to Wealthy as far as economic importance is concerned. Found on twigs of Goodhue variety at Waterloo. (Vaughan)

Minnesota: Ornamental crab (Pyrus ioensis) extremely susceptible. Twigs as well as leaves attacked. Wealthy most susceptible. (Sect. Plant Path.)

Control

Such data as were received for control deal primarily with the eradication of cedar trees. An idea of the extent of cedar tree eradication in Virginia will be gained from a digest of data furnished by W. J. Schoene, of the Virginia State Crop Pest Commission, under whose direction this work was carried out. This information is included here because it represents a successful effort on a large scale to eradicate the intermediate host of a heteroecious fungus affecting apples.

"The total acreage reported cut over in 1922-1923 was approximately 200,000, at an expense to the growers of approximately $30,000. From 1923 to 1925 an additional 61,817 acres were cleared of cedars. The cost of removing cedar sprouts during this period was $3,859.36. A most conservative estimate of the returns in increased production resulting from cedar eradication for one year (1923) is $300,000."

Virginia: Seasonal weather conditions will determine very largely the intensity of infection by cedar rust. In 1925 a safe cedar-free zone was approximately two miles in extent. Cedar rust infection in 1925 was the lightest during the past four years. The two-mile zone would probably not be so safe in a year of heavy infection. Notable decrease of rust injury is found on apples within a mile of cedar trees.

Table 50. Leaf infection of York in relation to distance from uncut cedar tree areas, Mt. Jackson, Virginia, 1925.

Distance (miles)	Percentage of leaf infection	Average number lesions per leaf
1	77.3	11.7
1-1/2	63.3	8.10
2	57.2	4.32
2-1/2	20.0	0.32

Spraying as a means of cedar rust control of apples is not practicable. Data prepared from plots of fully sprayed and unsprayed Rome Beauty during four years, 1922-1925, indicate that no appreciable control of cedar rust resulted from applying a full program of sprays. (Fromme & Schneiderhan)

APPLE - Cedar rust; Blackrot

According to Schoene et al (4) it appears that orchards in which the average infection does not exceed two or three spots per leaf will mature the crop normally. Injury is noticeable when the number exceeds three spots, even under favorable conditions for apple production. Serious defoliation and reduction in crop occurs when the number of spots reach 8 to 10 per leaf, and as many as 20 spots per leaf produce such severe injury that the fruit stops growing when about one-third mature.

Recent literature on cedar rust

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2. Campfield, W. S. Cedar rust control. Rep. Virginia State Hort. Soc. 28: 33-38. 1924.

3. McCubbin, W. A. Apple rust and its control. Bul. Pennsylvania Dept. Agr. 8 (15): 1-10. Sept. 1, 1925. General bulletin No. 411.

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5. Talbert, T. J. Cedar rust of apples in Missouri. Missouri Agr. Exp. Sta. Circ. 135: 1-8. Apr. 1925.

6. Waite, M. B. Apple cedar rust control. Proc. Ann. Blister Rust Conf. 10: 29-34. 1925.

BLACKROT OF APPLE CAUSED BY PHYSALOSPORA MALORUM (PK.) SHEAR

Geographic distribution, relative prevalence, and importance

Twenty-seven states reported on blackrot in 1925. No radical difference in geographic distribution was noted. It may be stated again, however, that blackrot is more severe in the southern, south central, and eastern states where the temperature is slightly higher than in the northern states. Of the twenty-seven reports submitted, eight reported the same prevalence as in 1924, five reported less, and only two reported more. Those reporting the same prevalence as 1924 are Connecticut, Ohio, Michigan, Minnesota, Iowa, Kansas, Tennessee, and Kentucky. Those reporting less are Delaware, Maryland, West Virginia, South Carolina, and Indiana. The two states reporting more were New Hampshire and Virginia.

In summing up the statements on relative prevalence we conclude, that in 1925 blackrot was slightly less prevalent in the United States than in 1924 or during the average year. Following are some of the reports from collaborators.

APPLE - Blackrot

New Jersey: Blackrot is comparatively unimportant this year being reported only from a few orchards. (Martin)

Maryland: Plentiful in unsprayed or improperly sprayed orchards, especially where dead wood has not been pruned out. (Jenle)

West Virginia: Quite prevalent. (Giddings)

Missouri: There has been a moderate amount of blackrot. (Bregger)

Nature of injury

It was thought worth while to include comments from collaborators regarding the relative importance of fruit, leaf, and branch infection in their respective states.

New Jersey: Observed on leaves, fruit, and twigs. (Martin)

Delaware: Slight leaf infection. Early fruit infection. (Adams)

Virginia: Blackrot injury in Virginia results from leaf and fruit infection, the latter being most important. A striking relation existed in Virginia between blackrot infection and fruit injury caused by codling moth. This insect was the cause of the heaviest losses to apples in Virginia in 1925. The heavy prevalence of blackrot this year is due very largely to worm injury through which the fungus gained entrance. A slight amount of blackrot infection also follows calyx-end injury. (Schneiderhan)

Tennessee: Leafspot, defoliation, and some fruit rot. (McClintock)

Kentucky: Leafspot quite common. (McGill & Valleau)

South Carolina: Cankers on nursery stock moderate. Fruit rot in orchards slight. (Fenner)

Alabama: Leafspotting and defoliation. Some fruit rot. (Miles & Blain)

Arkansas: Frog-eye leafspot very abundant on unsprayed trees. (Young)

Indiana: Fruit rot following bruises, hail injury, or worm injury. Some calyx infection. (Gardner)

Michigan: Cankers on limbs. (Bennett)

Minnesota: Follows fireblight; slight injury to fruit. No leafspot recorded this year. (Sect. Plant Path.)

Missouri: In most cases blackrot follows hail injury. (Bregger)

Losses

The losses from blackrot injury in the United States this year were less than normal. The accompanying table 51 gives the percentages reported from the different states.

Table 51. Estimated losses from blackrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
--	Tennessee	trace	Maine, New Hampshire, Vermont, New York, New Jersey, West Virginia, South Carolina, Illinois, Minnesota, Kansas, Kentucky, Colorado, Louisiana, South Dakota, California
4	Maryland		
3	Georgia, Iowa, Ohio		
2	North Carolina		
1.5	Virginia		
1	Connecticut, Michigan, Rhode Island, Mississippi		
.5	Delaware, Indiana, Alabama		

Weather relations

The effect of weather noted on other diseases of fruits applies also to blackrot. Since spore exudation results only from soaking of cankered twigs, the periodicity and amount of rainfall in any locality will determine largely the blackrot infection, particularly on fruit which has been injured by insects or spray material.

New York (Wayne County): This disease is appearing in larger amounts with the wet weather, but it is much less abundant than last year. (W. D. Mills, New York State Coll. Agr. Weekly News Letter, Aug. 17)

North Carolina: Less prevalent on account of drouth. (Lehman & Fant)

Arkansas: Not common this year in the apple section of northwestern Arkansas. The dry spring apparently unfavorable. (Young)

Indiana: Dry April and May unfavorable. (Gardner)

A record of first appearances of blackrot as reported by the collaborators follows:

Dates and location of earliest reported appearance of blackrot, 1925

March 28	Rodman	South Carolina	May 22	Mower	New York
April 23	Lawrence	Indiana	May 25	Columbia County	New York
April 27	Blacksburg	Virginia	June 11	North Stonington	Connecticut
May 10	Springhill	Tennessee	July 13	Wilton	New Hampshire

Varietal susceptibility

Delaware: Early Ripe leaf infection noted for April 22 and fruit infection (mostly calyx) July 9 at Seaford. (Adams)

APPLE - Blackrot; Bitter rot

Virginia: Mostly on Ben Davis, Grimes, Delicious, and Yorks following worm injury. Calyx injury caused by spray burn followed by blackrot mostly in Ben Davis. (Fromme & Schneiderhan)

Tennessee: Especially bad leafspot on Yellow Transparent and Dutchess. (McClintock)

Indiana: Frog-eye noted on Transparent and Rome. (Gardner)

Control

According to Doran (1)

"In the Baldwin orchard there were three times as many leaves with frog-eye leafspot on check trees as on those dusted with sulfur. In this orchard, 7.2 per cent of the fruit on the check trees became infected with blackrot, while the disease was present on only 0.9 per cent of the fruit dusted with sulfur."

Attempts made to discover the causal agent of frog-eye in Pennsylvania were reported by Walton (4) to be unsuccessful.

Fenner (2) has described a rot of apple which is very similar to blackrot, but which is caused by Botryosphaeria ribis. Shear et al (3) have compared the morphology of this fungus and of Physalospora malorum.

Recent literature on blackrot

1. Doran, W. L. Experiments on the control of apple scab and blackrot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 10 pp. (unnumbered). 1925.

2. Fenner, E. Aline. A rot of apples caused by Botryosphaeria ribis. Phytopath. 15: 230-234. Apr. 1925.

3. Shear, C. L., Neil E. Stevens, and Marguerite S. Wilcox. Botryosphaeria and Physalospora in the eastern United States. Mycologia 17: 98-107. 1925.

4. Walton, R. C. Black rot of apple. In Pennsylvania Agr. Exp. Sta. Bul. 196 (Ann. Rept. Director 1924-25): 18. 1925.

BITTER ROT CAUSED BY GLOMERELLA CINGULATA (STON.) SPAULD. & SCHRENK

During the past six years the data submitted by collaborators indicate that Virginia, North Carolina, South Carolina, Georgia, Tennessee, Alabama, and Mississippi have suffered the most severe losses from bitter rot in the United States. The status of this disease in 1925 may readily be judged by the fact that none of the above mentioned states have reported more bitter rot than usual and most of them have reported less. We infer, therefore, that this dis-

ease was not only below normal in prevalence, but that the economic losses in the country were smaller than usual.

The heaviest loss from bitter rot in the United States in 1925 was reported from North Carolina where this disease caused a total crop reduction of 3 per cent. Following is a brief table indicating the bitter rot losses in the country in 1925.

Table 52. Estimated losses from bitter rot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	North Carolina	trace	Maine, New York, Massachusetts, Rhode Island, Connecticut, New Jersey, West Virginia, Nebraska, South Carolina, Louisiana, Kentucky, Arkansas, Kansas, South Dakota, Colorado
2	Maryland		
1	Georgia, Alabama, Ohio, Tennessee		
.5	Virginia, Illinois		
.25	Delaware		
.1	Indiana		

Dates and location of earliest appearance of bitter rot, 1925

March 28	Rodman	South Carolina	July 6	Knox County	Indiana
May 16	Lawrence County	Missouri	August 8	New Brunswick	New Jersey
July	- - -	Illinois	August 19	Seaford	Delaware
July 3	Crozet	Virginia	September 3	Norwalk	Connecticut

No clear-cut statements concerning susceptibility or resistance of varieties were made. In Delaware the disease was reported on King David; in Virginia on Pippin, Ben Davis, and Smoke House; Indiana on Jonathan, Grimes, Transparent, and Ben Davis. The worst infection, according to Gardner (Indiana), was found on low hanging fruit. Illinois reported bitter rot on Jonathan, Ben Davis, and Grimes.

Very few reports on weather relations were received. Only three states reported more bitter rot than last year than normal. These were Indiana, Illinois, and Maryland. In Indiana, according to Gardner, "The high rainfall of July, August, and September was favorable to the disease." In Illinois, according to Anderson and Tehon, "Mid-season rains started infection but dry summer prevented further infection and trouble."

The following report on spore exudation was received from Schneiderhan of Virginia:

> "The commonest method of over-wintering of bitter rot in Virginia is in bitter rot mummies. The removal of bitter rot mummies together with a few bordeaux sprays will easily control this disease in this state. In 1925 spore exudation records were kept at Winchester. The following table of this record is presented."

Table 536 The dates and amounts of spore exudations from bitter rot mummies, together with the rainfall causing these exudations, Winchester, Virginia, 1925.

Date	Exudation	Rainfall (inches)
June 14	Slight	.15
June 18	Heavy	.20
June 23	Heavy	.48
June 24	Heavy	.76
July 4	Heavy	.33
July 15	Heavy	.70
July 21	Slight	.90

"In experimenting on the control value of bitter rot mummy removal at Winchester, it was found in 1924 and 1925 that in spite of careful demummification of certain isolated Smoke House trees, the disease appeared in mid-season and caused a total loss in two large trees. This suggested another means of carrying over the disease. An examination of twigs just above heavily infected apples showed a somewhat cankered condition, although the term 'canker' does not describe the conditions of these twigs, which were roughened with partly shredded bark. As a result of inoculation experiments it was proved conclusively that these twigs were infected. This is the first report of twig infection of bitter rot north of South Carolina. Further investigations in Virginia will be conducted next year in an effort to determine, if possible, additional varieties in which the bitter rot fungus is carried over, not only in mummies, but also in twigs."

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

This disease appeared in epiphytotic form in a large number of states this year. It was particularly severe in the largest apple production sections of the country, like New York, Michigan, Washington, and Oregon, but exceptionally heavy loss was reported also from such southern states as Georgia and Alabama.

Of the states reporting on the prevalence of blight this year, fifteen reported more than in 1924, nine reported less, and seven the same. Compared to normal prevalence, twelve reported more, ten less, and five the same. We infer, therefore, that the average prevalence in the United States is not only greater than that for 1924 but also greater than normal. A better idea of the situation in the various states can be gained from the following quotations.

Massachusetts: Severe blossom and twig infection throughout the state. Quince seems to suffer more than apple. Relatively little on pear. (Osmun & Davis)

New York: Extremely severe on apples and pears this year over the entire state. (Chupp)

APPLE - Blight

Delaware: Much less than last year. Appeared last week of May and very little spread observed. (Adams)

Virginia: Slight injury. First appearance, May 10 at Winchester and Crozet. Said to increase rapidly for about a week, but after that subsided with comparatively little injury. (Fromme)

West Virginia: About as usual; no serious outbreaks. (Giddings)

South Carolina: Present in about the usual amount. (Ludwig)

Georgia: In spite of extremely dry weather blossom-blight on apples seems to be unusually bad this year. (Higgins)

Oklahoma: Twig infections abundant on Jonathan and Ben Davis early in spring. Leaf infections were abundant in June, but since then they have gradually disappeared without material damage. (Rolfs)

Arkansas: Severe on several varieties. Appeared later than last year and continued later. In general not so severe as last year but more important. (Young)

Illinois: Extremely bad throughout state. Worse blossom blight in ten years. (Anderson)

Indiana: Very serious. (Gardner)

Michigan: Blight is everywhere present and has caused heavy loss. There appeared to be an unusually high percentage of cankers active in the spring. (Bennett)

Wisconsin: Additional reports indicate fireblight to be more widespread and destructive than for many years. It is causing great damage to home orchards. (Vaughan)

Minnesota: Unusually severe on all susceptible varieties throughout the state. The most susceptible varieties of apple are gradually being killed off. Except for fireblight apples were very free from disease this year. (Sect. Plant Path.)

Missouri: Fireblight of apples has been particularly severe this season. (Bregger)

Nebraska: Much more prevalent and worse than last year. (Peltier)

Kansas: Unusually severe this spring. Worse damage in older orchards. This year's crop was decidedly reduced due to blossom-blight and next year's crop is handicapped due to spur blight. Loss conservatively estimated at 5 per cent for the state. (White)

Oregon: In the Milton-Freewater district it occurred in all orchards and on practically all varieties. (Barss)

The relative prevalence of blight is shown in table 54.

Table 54. Relative prevalence of apple blight in 1925 compared with 1924 and average year.

State	Prevalence compared with		State	Prevalence compared with	
	1924	Average year		1924	Average year
Connecticut	same	same	Illinois	same	more
New York	more	more	Michigan	same	more
New Jersey	same	less	Wisconsin	more	more
Delaware	less	same	Minnesota	more	more
Maryland	less	less	Iowa	more	----
Virginia	less	less	Missouri	same	----
West Virginia	more	less	South Dakota	less	less
Kentucky	more	more	Nebraska	more	----
Tennessee	less	less	Kansas	more	more
North Carolina	same	same	Montana	less	less
South Carolina	less	less	New Mexico	more	same
Georgia	more	more	Idaho	less	less
Alabama	more	more	Washington	more	more
Arkansas	less	same	Oregon	more	more
Ohio	more	less	California	same	same
Indiana	more	more			

Blight was reported on all parts of the tree except the roots. The severest losses occasioned this year were apparently in the form of blossom and twig blights. Although in some states severe blight cankers resulted and in Minnesota entire trees were killed, the disease caused the most immediate injury in the form of blossom blight which prevented the setting of fruit. It is apparent that unusually heavy twig infection in 1925 in conjunction with favorable weather conditions in 1926 will result in a very severe loss next year if weather conditions are favorable.

The losses from fireblight for 1925 were very heavy throughout the country. In certain states, particularly Minnesota, New York, and Michigan, it was nearly as important as scab.

Table 55. Estimated losses from blight as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
8	Michigan, Kentucky	1	South Carolina, Arkansas, Washington, Oregon
7	New York		
5	Minnesota, Iowa, Kansas, Mississippi	.25	Connecticut
4	Maryland, Wisconsin	trace	Maine, New Hampshire, Vermont, Rhode Island, New Jersey, Delaware, Virginia, West Virginia, Georgia, Idaho, Montana, Wyoming, Colorado
3	North Carolina, South Dakota, New Mexico		
2.5	Alabama		
2	Indiana, Illinois, Ohio, Texas		

APPLE - Blight

The record of the first appearance of blight in the various states in 1925 is as follows:

March	Auburn	Alabama	May 19	Westminster	South Carolina
April 10	Knoxville	Tennessee	May 25	Nassau	Delaware
April 20	Anna	Illinois	May 28	Mower County	Minnesota
May 4	Columbia	Missouri	June	Habersham	Georgia
May 8	Lincoln	Nebraska	June 2	Shiloh	New Jersey
May 10	Winchester	Virginia	June 23	Unionville	Connecticut
May 11	Genesee	New York			

Control

Wisconsin: Door County fruit growers have organized a campaign to eradicate the blight by severe pruning in badly blighted orchards near Fish Creek to protect the large holdings at Sturgeon Bay. (Vaughan)

Barnett (1) reports the results of treatment in a Jonathan orchard heavily infected with fireblight. The infected parts of the trees were excised and the wounds disinfected with Reimer's combination of cyanide and bichloride of mercury followed by the application of a mixture composed of one part water in three parts waterglass. Only 21 out of 573 wounds thus treated showed evidence of active infection when inspected. The article emphasizes the importance of eliminating hold-over cankers, planting resistant varieties, retarding the rate of twig growth, and controlling insect pests, particularly aphids.

An outstanding contribution to our knowledge of the cytology and overwintering habits of Bacillus amylovorus resulted from the investigation of Nixon (2). An abstract of his paper presented at the Kansas City meeting has been printed in Phytopathology.

Recent literature on blight

1. Barnett, R. J. Two seasons' work with fireblight on apples. Proc. Amer. Soc. Hort. Sci. 21: 292-296. 1925.

2. Nixon, E. L. Migration and transformation of Bacillus amylovorus in apple tissue. (Abstract) Phytopath. 16: 77. Jan. 1926.

3. Seal, J. L. Apple blight, question and answer exercise. Minn. Hort. 53: 172-174. June 1925.

4. Talbert, T. J. Fireblight of apples and pears. Missouri Agr. Exp. Sta. Circ. 137: 1-8. July 1925.

BLISTER CANKER CAUSED BY NUMMULARIA DISCRETA (SCHW.) TUL.

The nature of this disease is such that wide variations in its prevalence cannot be expected. Blister canker in the United States may be said to be a typical Ben Davis disease, particularly in old orchards, since very few of the other important commercial varieties seem to suffer from it. It is a well-known fact that in years of extreme drouth severely cankered trees

will show greater evidence of injury and the rate of killing of severely infected trees will be greater than in years of average moisture. This fact was very noticeable this year in Virginia, according to Fromme who reports on this disease, "Unusually noticeable because of dry season."

Nothing new can be added to the general data on this disease as reported in previous supplements. Compared to last year the prevalence was practically the same. Of the eleven states reporting on this disease, ten reported the same prevalence as 1924 and one other reported less. Only Virginia, Illinois, Kansas, and Tennessee reported blister canker to be important in 1925

Delaware: Generally prevalent in neglected trees. No noticeable increase observed. (Adams)

Tennessee: Important in neglected orchards. Observed only in eastern Tennessee. (Peacock)

Oklahoma: A very common parasite in many of the orchards of the state. (Rolfs)

Arkansas: Becoming less important as susceptible varieties like Ben Davis are being eliminated. Better care of orchards also effective. (Dept. Plant Path.)

Illinois: Worse on Ben Davis, especially in the western portion of the state where Ben Davis is the main crop. (Anderson & Tehon)

Kansas: Important. Ben Davis seems to be most susceptible. Important disease on account of killing older plantings. (White)

Losses

Only five states reported losses, among them New York, Maryland, Tennessee, and Virginia reported a trace, while Illinois reported 1 per cent. No information was received relative to control measures.

FRUIT SPOT CAUSED BY PHOMA POMI PASS.

Fruit spot was negligible in importance in the United States this year. Only seven states reported on its relative prevalence while eleven simply reported it to be present. During the past five years this disease has been of considerable importance in certain states. In favorable years it is one of the important diseases of apples in the Hudson Valley, but this year no reports were received from New York.

From the limited data available for 1925 we conclude that fruit spot was unusually late in appearance. According to Martin of New Jersey, "In most cases the disease did not appear until after harvest. This disease was not severe if the apples were placed in storage." From Delaware, which has for several years reported considerable loss, only a trace was reported for this year on the late crop. According to Young of Arkansas, "Less than usual at this time. Dry spring apparently unfavorable." Michigan reports it to be of

"minor importance." Vaughan of Wisconsin states, "None seen or reported." According to the Department of Plant Pathology (Washington), "Not reported but known to occur in the central and eastern Washington apple section."

Delaware, Maryland, and West Virginia reported a trace of loss, while in Ohio and New Jersey .5 and .25 per cent respectively was estimated.

BITTER PIT, NON-PARASITIC

Bitter pit is one of the few diseases reported in 1925 to be of greater prevalence than in 1924 or in the average year. Fourteen states reported on this disease, eight of which reported more than in 1924, five the same, and only one less. The states reporting more were New Hampshire, New York, Indiana, Michigan, Idaho, California, and New Jersey. Those reporting the same prevalence as last year were Connecticut, Maryland, West Virginia, Ohio, and Minnesota. Only Kentucky reported less.

Serious losses were reported from Ohio, Indiana, Virginia, Michigan, and California. In the last mentioned state, the entire crop was ruined in some orchards. Only three states reported data on losses. These were Virginia, 5 per cent; Maryland, .5 per cent; and West Virginia, 1 per cent. The following dates of first appearance of bitter pit were received.

Dates and location of earliest reported appearance of bitter pit, 1925

August 8	Wilton	New Hampshire	September 21	Wallingford	Connecticut
August 20	Saugatuck	Michigan	September 27	St. Paul	Minnesota
September 1	Gatlinburg	Tennessee	September 30	Orange Co.	Indiana
September 5	Winchester	Virginia	October 6	Flemington	New Jersey

Only four states reported on varietal susceptibility to bitter pit. In Virginia this disease is most important on Yorks. It also affects Ben Davis and Delicious. In Indiana it was serious this year on Stayman and Delicious. Michigan reports bitter pit on Baldwin.

It is usually assumed in the literature on the subject of bitter pit that the sunken spots and the laying down of the corky tissue is the result of an improperly unbalanced water supply. Various theories have been advanced to explain the development of this disease. In view of the comparatively heavy prevalence in 1925 it seems reasonable to assume that the abnormally deficient rainfall in the states reporting the heaviest losses from this disease is the important factor.

Virginia: The unusually large York fruit in the upper Valley of Virginia were particularly subject to bitter pit injury in 1925. York is the most important commercial variety in this section and by far the most susceptible to bitter pit injury. Seasonal conditions in this state were such as to cause an unusual early sizing up of fruit. A large percentage of Yorks were of normal size on September 1 but considerable growth took place after that date. The largest sized fruit produced in four years was the result. (Schneiderhan)

APPLE - Jonathan spot; Crowngall

JONATHAN SPOT, CAUSE UNDETERMINED

This disease was slightly more prevalent this year than last. Although it is not a serious factor resulting in large general losses it is important locally. Idaho, which produced the third largest crop in the United States in 1925, reported more Jonathan spot than in 1924 and also more than normal. None of the states reporting indicated that this trouble was of great importance in 1925. Iowa reports that it was a serious factor in stored fruit. In Tennessee Baskin stated that it occurred only in storage. In Minnesota, according to the Division of Plant Pathology, it was in a few orchards of Wealthys only. Hungerford of Idaho reports that it was more important than usual and appeared earlier

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

From the reports of collaborators in 1925 we infer that crowngall prevalence in the United States this year was about the same as last year and as in normal years. Kansas reports 25 per cent of nursery stock infected by this disease in the Kaw Valley. As in previous years it was reported chiefly from those states in which the nursery business is important. A few quotations from various collaborators follow:

Tennessee: On one-year old trees 15 to 20 percent, on two-year old trees 60 to 70 per cent. (Fackler)

Arkansas: Nursery losses great. Not certain how much of this is true crowngall. (Dept. Plant Path.)

Wisconsin: Dr. A. J. Riker who has inspected the largest Wisconsin nurseries reports more of the bacterial gall than usual with much less of the excess callus or root knot. (Vaughan)

Minnesota: Found where the apples are grown; mostly in the lower two-thirds of the state. (Dept. Plant Path.)

Crowngall surveys

During the fall of 1925 A. J. Riker of Wisconsin and J. H. Muncie of Iowa made surveys of nurseries to ascertain the amounts of excess callus, true bacterial gall, hairy root, and gall and root knot found on nursery stock.

The general notes of Riker's survey prepared from nursery inspections in Michigan, New York, Connecticut, Pennsylvania, Maryland, West Virginia, Ohio, and Indiana and submitted to the Plant Disease Survey is as follows:

1. "Bacterial gall was widely distributed but was present on only a very small percentage of the trees examined except at one nursery in Michigan.

2. "Much less excess callus was found on apple where budding was practiced in contrast with places where grafting was done, except in three nurseries where unusual care was taken to make well-fitted grafts.

3. "In general the amount of root knot on apple in the northeast where the practice of budding predominates is much less than in the middle west where grafting predominates.

4. "Grafting of apple trees has been largely discontinued in the northeast because of the larger amount of root knots and less well-developed root systems which develop on grafted stock.

5. "Bacterial gall was found widely distributed on peach, but with the exception of one nursery was present on only a very small percentage of the trees examined."

Muncie's inspections were made in Iowa, Kansas, Missouri, Indiana, New York, Virginia, Tennessee, and Alabama. The summary of his observations follows:

1. "True crowngall was as widespread in the eastern and southern states visited as in the central western states.

2. "With the exception of one nursery, non-pathogenic knots at the union of grafted trees was also as widespread and as frequently found as in the middle western nurseries.

3. "Budding is more generally practiced in the eastern states and this reduces losses due to callus knots on apple.

4. "True crowngall on peach was found in every nursery visited but only in slight amounts.

5. "Hairy root on budded apples was abundant in all nurseries visited but especially so in the southern states. This appeared for the most part to be non-pathogenic. No manifestation of hairy root was seen on peach."

Crowngall investigations

Studies on the relation of crowngall to apple nursery stock have been continued in Iowa and Wisconsin. Riker and Keitt (4) report:

"Isolation studies were made on 227 apple trees, representative of lots of stock submitted as crowngall rejects by 12 nurseries in six states. Less than two per cent of these trees yielded Bacterium tumefaciens Smith and Town. Tests of the isolation technique on known crowngall material gave positive results from 44 to 46 plants. A study of the trees which failed to yield the crowngall organism showed most of the malformations to be associated with poorly fitted grafts. Various types of misfitted grafts were grown experimentally in com-

parison with well-fitted grafts. Malformations could be induced or prevented almost at will by the type of fit. An examination of samples of freshly prepared commercial grafts from eight nurseries showed misfits in sufficient numbers and types to account for all the root knot reported by these nurseries. The following types of misfit appear to lead commonly to the more severe callus overgrowths: cion tip long, cion larger than stock, graft too loosely wrapped. Wrapping grafts with cloth waxed paper, or medical adhesive tape reduced the amount of callus development. The results thus far available give promise that the major portion of the callus overgrowths at the unions of grafted apples may be prevented by modifications in grafting practice."

Muncie (2) says:

"Three distinct types of hairy root have been observed on French apple seedlings, namely: (1) the woolly knot form, arising from a distinct gall; (2) the simple form described by Stewart; (3) the type in which fine fibrous roots arise in clusters from the tap root."

The same writer (3) reports:

"Work has been continued on water conduction in galled and normal piece-root grafted two-year cut-back Wealthy, Jonathan, and Salome apple. The reduction in water flow through galled Wealthy, Salome, and Jonathan trees was 69.7, 21.7, and 47.2 per cent respectively. Lateral roots arising from above or opposite the gall may in some cases counteract the obstruction offered by the gall.

"Young tomato plants were set in soil infested with Bacterium tumefaciens and inoculated by injuring the stem at the surface of the soil and smearing the wound with the infested soil. Typical crowngall resulted up to 102 days after infesting the soil."

According to Sherbakoff (6):

"In a single experiment sulfur applied at the rate of 600 pounds per acre appeared to reduce the number and size of the crowngalls produced on nursery apple trees. The sulfur was applied to alternate rows and thoroughly mixed with soil in the furrow before the grafts were set."

Waite and Siegler (7) have reported on control by chemical treatment of the grafts:

"In the experiments of 1925 the organic mercury treatment was given to 2,169 grafts, representing a number of different varieties with the result that the total number of trees obtained at digging time with both large and small galls amounted to 6.1 per cent, as compared with 32.6 per cent on 2,619 untreated grafts of the same varieties which were used as checks. The proportion of the total number of galls in the treated grafts of all varieties was 2 per cent and in the untreated or check grafts 28.7 per cent.

"The following treatment of apple grafts for the control of crowngall is recommended as a result of a large number of experiments over a number of years:

"(1) Select seedlings free from hairy-root and crowngall infection.

"(2) After washing, dip for 10 minutes uncut seedling and scions in a solution consisting of one part of hydroxymercurichlorophenol* to 400 parts of water (approximately at the rate of one ounce to three gallons). In this as well as in subsequent dips do not rinse with water, and keep the solution in either a wooden or a nonmetallic container.

"(3) Dip the grafts, which should be well fitted and carefully wrapped, in this same freshly made solution for about five seconds.

"(4) Store grafts under cool conditions and dip grafts for about five seconds in a freshly made solution of the mercury compound immediately before planting.

"(5) Keep the bench on which the grafting is done, as well as all grafting tools, disinfected by frequent washings with a germicide."

*Obtainable on market in powdered form under the trade name "Semesan."

Recent literature on crowngall

1. McClintock, J. A. Progress report on crowngall experiments conducted at the University of Tennessee Experiment Station. Proc. Tennessee State Hort. Soc. 19: 86-88. 1924.

2. Muncie, J. H. Hairy root of apple seedlings. (Abstract) Phytopath. 16: 78. Jan. 1926.

3. _____ The effect of crowngall on young apple and peach trees and longevity of Bacterium tumefaciens in the soil. (Abstract) Phytopath. 16: 79. Jan. 1926.

4. Riker, A. J., and G. W. Keitt. Studies of crowngall and callus overgrowths on apple grafts. (Abstract) Phytopath. 16: 78. Jan. 1926.

5. _____ Crowngall in relation to nursery stock. Science 62: 184-185. Aug. 21, 1925.

6. Sherbakoff, C. D. Effect of soil treatment with sulfur upon crowngall in nursery apple trees. Phytopath. 15: 105-109. 1925.

7. Waite, M. B., and E. A. Siegler. A method for the control of crowngall in the apple nursery. U. S. Dept. Agr. Cir. 376: 1-8. Jan. 1926.

APPLE - Sooty blotch; Flyspeck; Powdery mildew

SOOTY BLOTCH AND FLYSPECK CAUSED BY GLOEODES POMIGENA (SCHW.) A. S. COLBY AND LEPTOTHYRIUM POMI (MONT. & FR.) SACC.

Only eight states reported on sooty blotch in 1925. This disease although of minor importance in the country as a whole has been known to cause serious losses in certain localities. On certain varieties like York, Stayman, Black Twig, and Ben Davis, it is serious in poorly sprayed orchards in Maryland, West Virginia, and Virginia.

Connecticut reports more sooty blotch than in 1924, Delaware reports less Virginia more, and Wisconsin the same as 1924. No state reported more than normal prevalence in 1925.

The following statements describe the disease status in certain states:

Connecticut: More than average year with prominence gained toward end of season on light skinned varieties. (Clinton)

Virginia: General and important in poorly sprayed orchards. A common cause of culls. (Schneiderhan)

Indiana: Serious in unsprayed orchards. Worst on light colored varieties such as Grimes and Northwestern Greening. (Gardner)

Michigan: About as usual, found mostly on Talman Sweet (Tollman) variet in unsprayed orchards. (Vaughan)

Minnesota: Considerable blotch developed in the Albert Lea section. It was present on all varieties, but most conspicuous on Greenings. (Sect. Plant Path.)

Dates of earliest reported appearance were reported as follows:

August 19	Wyoming	Delaware
September 10	Winchester	Virginia
September 22	Milford	Connecticut

Recent literature

1. Kendall, J. C. Sooty mould. (Data from work conducted by O. R. Butler). In New Hampshire Agr. Exp. Sta. Bul. 216 (Rept. of Director 1924): 14-15. 1925.

POWDERY MILDEW CAUSED BY PODOSPHÆRA LEUCOTRICHA (ELL. & EV.) SAIM.

Although this disease is of minor importance in the United States it has been known to cause serious losses on certain varieties. The Jonathan seems to be particularly susceptible to powdery mildew infection and this variety has been known to be severely injured as a result of twig growth following the killing of terminal leaves. Twelve states reported on powdery mildew in 1925. In regard to the prevalence of this disease compared both with 1924 and with

normal, three states, Delaware, Indiana, and California, reported greater prevalence; three, Connecticut, New York, and Oregon, reported less; while Maryland, Virginia, West Virginia, Michigan, Wisconsin, and New Mexico reported the same prevalence.

Powdery mildew is an early season disease as will be indicated by the dates of first appearance.

Dates and location of earliest reported appearance of powdery mildew, 1925

May 1	Winchester	Virginia	June 4	Mt. Holly	New Jersey
May 7	Yalesville	Connecticut	July 23	Hennepin County	Minnesota
May 18	Dutchess County	New York	September 28	Gibson County	Indiana
May 22	Bridgeville	Delaware			

Notes from collaborators

New Jersey: Powdery mildew was found in abundance on Rome Beauty in Burlington County. (Martin)

Delaware: More general than usual. Common on Stayman, Rome Beauty, and Transparent. (Adams)

Virginia: First observed May 1 at Crozet and caused some local injury there and at Winchester; especially on Jonathan and Stayman. (Fromme)

Tennessee: Fairly important. Causes leaf and twig defoliation. Confined to Rome Beauty and Jonathan. (Baskin)

Minnesota: Causes partial defoliation in nurseries. Chiefly found on young trees in nurseries. (Dept. Plant Path.)

ROOTROTS

Black rootrot caused by Xylaria spp.

It is very probable that black rootrot is more prevalent than the usual estimates would seem to indicate. It is particularly prevalent in the southern states where it sometimes causes severe losses in old orchards. The following reports throw some light on the status of this disease in 1925.

Virginia: Percentage of tree death greater than in normal years. The dry season evidently caused many trees to die during the year which would ordinarly have survived for another year or so with normal rainfall. (Fromme & Schneiderhan)

Kentucky: Very important; widely distributed. Perhaps 1 per cent of trees dying per year. (Magill & Valleau)

APPLE - Rootrots; Frost injury

Tennessee: More Xylaria than last year. Trees die while leaves and fruit remain. Found on Ben Davis and Grimes. (Baskin)

Mushroom rootrot caused by Armillaria mellea (Vahl) Quel.

This is another minor disease of apples. Only two states reported losses in 1925 and these were New York and West Virginia, both reporting a trace. Sixteen states prepared a report on this disease and of these thirteen reported it to be unknown in the state.

Other rootrots

Ozonium omnivorum Shear was reported by Taubenhaus as "Very important in the black lands of Texas, where apples cannot be grown on account of it." Undetermined rootrots of various types were reported from several states.

FROST INJURY

From the data submitted by the collaborators, shown in the accompanying table, frost injury in certain states was by far the largest factor causing loss to apple production this year.

Table 56. Estimated losses from frost injury as reported by collaborators, 1925.

Percentage loss	State reporting
80	South Dakota
50	Iowa
40	Virginia
25	West Virginia, Maryland, Minnesota
20	Ohio
10	Michigan

Delaware: Frequent frosts occurred during April. Blossoming varieties hurt mostly. (Adams)

Virginia: Frosts on April 21 with a temperature of 28 degrees were general in the Valley of Virginia and caused a loss of 40 per cent. The blossoms were killed, leaves severely injured, and the fruit showed a high percentage of russeting and frost rings. (Schneiderhan)

Indiana: Frost May 25 was very serious. Worst russet and lopsidedness of Ben Davis resulted in southern Indiana. (Gardner)

Illinois: General frost May 23 and 24 caused serious losses in all sections of the state and deformed apples were common due to the advanced stage of the fruit. It was not generally killed outright. (Anderson)

APPLE - Frost injury; Hail injury; Other diseases

Minnesota: Frost tended to thin amount of fruit on trees, but did not cut down crop as much as at first supposed. (Div. Plant Path.)

HAIL INJURY

Severe losses were reported as a result of hail injury in Connecticut, West Virginia, Virginia, Minnesota, and Iowa. From Virginia, Schneiderhan reports the following:

> "Hail losses throughout Virginia have been so severe locally during the past four years that all insurance companies have been doing business at considerable loss. The result has been the rapid increase of premiums for this type of insurance. The largest single hail loss on apples ever adjusted in the United States occurred in an orchard near Mt. Jackson, Virginia. This orchard was insured for $67,000, and as a result of an 80 per cent adjustment the insurance company paid to the owner $53,187.85."

OTHER DISEASES AND INJURIES

There are very many miscellaneous diseases and injuries of apples of considerable importance locally but unimportant from a country-wide standpoint. It is manifestly impossible to go into a detailed description of some of these diseases in a summary of this kind, therefore, we shall give brief quotations from collaborators concerning them and give a list of the recent literature dealing with them.

Alternaria sp., blossom-end rot - New Jersey.
Botrytis sp., fruit rot - Washington.
Cephalothecium roseum Cda., pink rot - New York.
Cercospora mali Ell. & Ev., leafspot - Texas.
Coniothyrium sp. - reported from Washington.
Gloeosporium perennans Zeller & Childs, perennial canker.

For some years difficulty has been encountered in controlling what was thought to be Neofabraea malicorticis in certain orchards in the Hood River Valley, Oregon. It has now been ascertained that at least one of the reasons for this is that there are the two distinct but similar forms. One is the common Neofabraea and the other a new fungus (Gloeosporium perennans Zeller & Childs.) For the disease caused by the latter Zeller and Childs (50) have proposed the name perennial canker.

The known distribution of the disease ranges from the Okanogan Valley, British Columbia, to the Willamette Valley, Oregon. It has also been reported from the Spokane and Wenatchee Valleys in Washington, and from certain stations along both sides of the Columbia River and especially the Hood River Valley where it has spread rapidly. It causes serious damage in some localities.

Neofabraea malicorticis (Cordley) Jack., anthracnose - Washington and Oregon. According to Zeller (Oregon), growers spray to control it, so there is comparatively little loss in the better commercial orchards.

APPLE - Other diseases

Nectria galligena Bres., European canker - New York, Maryland, Washington, and Oregon. It was of no great economic importance anywhere.

Penicillium expansum, rot - causing loss in transit, Texas.

Phytophthora cactorum (Leb. & Cohn) Schroet., rot - New York and Indiana. According to Gardner (Indiana), "It is rather serious locally. High rainfall favorable. Noted first on drops under trees, later in the packing sheds."

Valsa leucostoma (Pers.) Fr., dieback - Missouri.

Volutella fructi Stevens & Hall, rot - West Virginia.

Measles (undet.) reported from New Mexico and West Virginia. According to Leonian, (West Virginia), measles were found in two orchards and were confined to Delicious trees. The disease apparently spread very slowly in these orchards, as in the last four years it has advanced not more than one row of trees. Each infected tree forms a center of infection so that spots of measled trees were found throughout that part of the orchard where the Delicious trees were planted. Infected trees are stunted, branches die back, in severe cases and in the course of a few years the trees become worthless. The symptoms do not appear during the growing season but they manifest themselves in the late fall and winter. Apparently severe pruning of infected wood checks the disease. According to Crawford (New Mexico), "Measles occur all over the state where Jonathan are grown. Most severe on alkaline soil."

Mosaic (chlorosis) - was reported on Baldwins in New York.

Rosette (non-par.) - Idaho.

A new disease resembling scald was observed in packing houses in several of the Northwestern apple districts during the past season. Apparently this trouble was found only on apples which had remained for sometime unwrapped in contact with some of the veneered tops and bottoms which were introduced for use in making apple boxes this season. Only that portion of the surface of the apple which had apparently been in contact with the wood was affected.

Leroy Childs, Superintendent of the Hood River Experiment Station, states that he and Gordon G. Brown, Station Horticulturist, are making observations concerning this new apple affliction. They have accumulated a number of common woods employed for box-making purposes, and have placed apples thereon to determine the effect. Owing to the fact that much confusion exists among lumbermen, relative to the specific names of the various woods involved, they have sent samples of all the wood received to Stanford University, for the purpose of getting a determination of each species of wood tested, so that they may accurately determine such woods as may cause injury. Mr. Childs states that they have obtained injury on wood that has been called Yellow Fir, Oregon Pine, and a material just labelled Fir, all of which he believes are Douglas Fir. (Robb, F. G. In U. S. Dept. Agr. Bur. Agr. Econ. Fruit & Veg. Div. Letter 6: 138. Mar. 27, 1925.)

Internal breakdown (non-par.) - Minnesota, Washington, and Idaho. In Idaho, according to Hungerford, it was especially bad on Rome Beauty, Winesap, and Jonathan.

Spot necrosis (non-par.) - reported from three counties in Washington.

Incompatibility of black walnut and apple trees - Schneiderhan (36) of Virginia reported the death of apple trees in the proximity of a black walnut tree. The area of toxicity coincided with the area of development of black walnut roots.

Winter injury - Oklahoma, Washington, Montana, and Oregon. According to Barss of Oregon it was important this year, being severe in the Willamette and Hood River Valleys, and worse on old than on young trees in the latter section.

APPLE - Other diseases

Spray injury - New Jersey, Washington, Connecticut, Delaware, Indiana, and Virginia. In New Jersey severe leaf injury followed the use of 4-5-50 Bordeaux. In another orchard where sulfur-lead-lime dust was used there was a severe burning of the center of the leaf. In the orchards sprayed with dry-mix sulfur-lime, brown circular areas resembling frog-eye were observed. In Indiana Bordeaux caused russet on Ben Davis, sulfur sunburn was noted on Rome and Kinnard and sulfur dust injury occurred in the experimental orchard at Lafayette.

In Virginia Schneiderhan (36) reported experiments on the results of using lime-sulfur alone and in combination with lead arsenate and calcium caseinate; Bordeaux mixture 3-4-50; lead arsenate; copper hydrate; and dry-mix sulfur lime. Spraying these materials at a temperature of 51° F., resulted in severe russeting by Bordeaux mixture and copper hydrate but no injury from the other materials. However, applying at 94° F. resulted in severe injury from the lime-sulfur combinations and no injury from Bordeaux, copper hydrate, lead arsenate and dry-mix. The maximum injury following Bordeaux occurred 20 days after application, while the maximum injury following lime-sulfur was noted five days after. The use of calcium caseinatein combination with lime-sulfur and lead-arsenate reduced spray injury 20 per cent.

Drouth injury - reported from five states. In a certain part of Texas, according to Taubenhaus, it caused a loss of 50 per cent. In Arkansas, many trees were killed or weakened by dry weather according to Young.

Sunscald (non-par.) - Delaware, New York, Arkansas. According to Adams of Delaware, "Sunscald became very prevalent on fruit the first week in June. Early Ripe, Transparent, Dutchess, and York Imperial showed greater injury than previously observed."

Disease surveys

The only apple disease survey reported this year was by Hurt of Virginia, (table 57).

Table 57. Apple diseases and other injuries found on Pippin, Winesap, York, Stayman, and Ben Davis in 32 orchards, Crozet, Virginia, 1925.

Disease	Per cent infected orchards	Maximum percentage of infection	Average percentage of infection
Scab	25.0	25.0	.15
Cedar rust	12.5	.15	trace
Bitter rot	9.4	14.	trace
Blotch	6.2	2.0	.09
Black rot	34.4	1.0	.2
Flyspeck	trace	trace	trace
Russet	6.2	11.3	.39
Sooty blotch	6.2	trace	trace
Fireblight	0	0	0
Bitter pit	31.2	50.	.62
Water core	0	0	0
Spray burn	37.5	11.3	.58

APPLE - Miscellaneous literature

Recent literature on miscellaneous apple diseases, apple spraying, etc.

1. Anon. Apple transport problems. Investigations by a scientific expedition from the food investigation board. South Africa Fruit Grow. 12: 269-271. Aug. 1925.

2. Anon. Experiments on keeping apples in oiled wrappers. Jour. Min. Agr. Great Britain 32: 626-629. Oct. 1925.

3. Anon. Tratamiento eficaz para combatir la 'fumagina' de la Manzana 'Cara Sucia'. (Control of flyspeck of the 'Cara Sucia' apple Min. Agr. Nac. (Buenos Aires) Secc. Prop. e-Inform. Circ. 468: 1-7. 1925.

4. Baker, C. E. How oiled wraps prevent scald on apples. Better Fruit 20 (20): 11-12. Aug. 1925.

5. Bhosalé, Y. P. Low temperature and root injury of the apple. Amer. Fruit Grower 45 (4): 12. 1925.

6. Birmingham, W. A. An uncommon watercore condition in apples. Agr. Gaz. New South Wales 36: 59-62. Jan. 1925.

7. Blake, M. A. Apples are injured by severe drought. Marked difference in varietal resistance. New Jersey State Hort. Soc. News 6: 132. Nov. 1925.

8. Briton-Jones, H. R. On the diseases known as 'bark canker' and 'die back' in fruit trees. Jour. Pomol. & Hort. Science 4: 162-183. 1925.

9. Brooks, F. T. Polyporus adustus (Willd.) Fr. as a wound parasite of apple trees. Trans. British Mycol. Soc. 10: 225-226. 1925.

10. Brown, E. Apple leaf scorch. Gard. Chron. III, 77: 440. June 1925.

11. Brown, W. A study of forms of Fusarium occurring on the apple fruit. Rep. Proc. Imp. Bot. Conf. London 1924: 339-346. 1925.

12. Carne, W. M. Cracking and russeting of Dunn's and other apples. Jour. Dept. Agr. Western Australia II, 2: 214. June 1925.

13. Carrick, D. B., and J. Oskamp. Storage scald of apples. Cornell Univ. Coll. Agr. Ext. Serv. Bul. 128: 1-10. Sept. 1925.

14. Dillon Weston, W. A. R. A preliminary note on the perithecia of Nectria galligena. Ann. Appl. Biol. 12: 398. 1925.

15. Doran, W. L. Experiments on the control of apple scab and black rot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 10 pp. unnumbered. 1925.

APPLE - Miscellaneous Literature

16. Durham, H. E. Apple leaf scorch. Gard. Chron. III, 77: 372-373. May 30, 1925.

17. _____. Apple leaf scorch. Gard. Chron. III, 78: 34. July 11, 1925.

18. Eriksson, J. Phytopathologische Mitteilungen I. Ark. Bot. 19 (6): 1-29. Apr. 1925. Fusarium wilkommi.

19. Fenner, E. Aline. A rot of apples caused by Botryosphaeria ribis. Phytopath. 15: 230-234. 1925.

20. Fulmer, H. L. The new spray materials. Canad. Hort. 48: 27-28; 46-48. Feb. 1925.

21. Hatton, R. G., and N. H. Grubb. Field observations on the incidence of leaf scorch upon the apples. Jour. Pomol. & Hort. Sci. 4: 65-77. Jan. 1925.

22. Hedrick, U. P. Winter injury of fruit trees. Amer. Fruit Grow. Mag. 45 (4): 3, 39. Apr. 1925.

23. Hooker, H. D. Copper hydroxide as a substitute for bordeaux. Proc. Amer. Soc. Hort. Sci. 21: 173-176. 1925.

24. Horne, A. S. Fungal diseases of stored apples. Rep. Proc. Imp. Bot. Conf. London 1924: 363-372. 1925.

25. Howitt, J. E. Crown or collar rot. Farm. Advocate 60: 553. Apr. 9, 1925.

26. Kidd, M. N., and A. Beaumont. An experimental study of the fungal invasion of apples in storage with particular reference to invasion through the lenticels. Mem. Food Invest. Bd. Great Britain 60: 14-33. 1925. Reprinted from Ann. Appl. Biol. Feb. 1925.

27. Lang, J. H. The development of "scald" in cold stored apples. Fruit World Australasia 26: 62-63. Feb. 1925.

28. McClelland, N., and L. W. Tiller. Flesh collapse in apples, season 1924. Influence of variety, maturity and cold storage conditions. Fruit World Australasia 26: 259-262. July 1, 1925.

29. Morse, W. J., and D. Folsom. Apple spraying and dusting experiments 1918 to 1924. Maine Agr. Exp. Sta. Bul. 325: 126-184. July 1925.

30. Motz, F. A., F. J. Schneiderhan, and W. J. Schoene. Spray information for Virginia fruit growers. Virginia Agr. & Mech. Coll. & Poly. Inst. Ext. Div. Bul. 94: 1-21. Jan. 1925.

31. Potter, G. F. Winter injury to apple roots. Fruit Belt 23 (11): 23, 25. Nov. 1925.

APPLE - Miscellaneous Literature

32. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables in storage. (Abstract) Phytopath. 16: 73. Jan. 1925.

33. Rhoads, A. S. Apple measles. Amer. Fruit Grow. Mag. 45 (1): 11-12. Jan. 1925.

34. Rose, D. H., and C. C. Lindegren. Phytophthora rot of pears and apples. Jour. Agr. Res. 30: 463-468. Mar. 1, 1925.

35. Ruth, W. A. Prevention of apple scald with oiled papers. Trans. Illinois State Hort. Soc. 58 (1924): 229-232. 1925.

36. Schneiderhan, F. J. Apple disease studies in northern Virginia. Virginia Agr. Exp. Sta. Bul. 245: 1-35. Feb. 1926.

37. Shear, C. L., N. E. Stevens, and M. S. Wilcox. Botryosphaeria and Physalospora in the eastern United States. Mycologia 17: 98-107. May-June 1925.

38. Smith, A. J. Brown heart in Australian apple shipments. Spec. Rep. Food Invest. Bd. Great Britain 22: 28 pp. 1925.

39. Smith, H. V. Cold storage experiments. Oiled wrappers prevent scald in Granny Smith apples at Batlow, New South Wales. Fruit World Australasia 26: 107. Mar. 1925.

40. Swartwout, H. G. Treatment of apple canker diseases. Missouri Agr. Sta. Bul. 228 (Ann. Rept. Director 1923-24): 59. 1925.

41. Swingle, C. F. Stem-borne rudimentary roots of apple - frequently confused with crowngall. U. S. Dept. Agr. Off. Rec. 4 (30): 5. July 29, 1925.

42. _____ Burr-knot of apple trees - its relation to crowngall and to vegetative propagation. Jour. Heredity 16: 312-320. 1925.

43. Thomas, H. E. Root and crown rot of apple. Proc. New York State Hort. Soc. 70: 171. 1925.

44. Thomas, P. H. Re-grafting apple trees. The fungus disease Polystictus versicolor is often troublesome. Some helpful suggestions. Fruit World Australasia 26: 66. Feb. 1925.

45. Togashi, K. Some studies on a Japanese apple canker and its causal fungus, Valsa mali. Jour. Coll. Agr. Hokkaido Imp. Univ. Sapporo, Japan 12: 265-324. Dec. 1924.

46. Van Poeteren, N. Verslag over de Werkzaamheden van den Plantenziektenkundigen Dienst in het jarr 1924. (Report of the activities of the Phytopathological Service in the year 1924). Versl. en Meded Plantenziektenkundigen Dienst de Wageningen 41: 62. 1925.

APPLE - Miscellaneous Literature
PEAR - Blight

Star apple trees at Bengen were defoliated by a leafspot which bore immature fruiting bodies resembling pycnidia of Phyllosticta mali.

47. Wallace, T. Apple leaf scorch. Gard. Chron. III, 62: 455-456. June 27, 1925.

48. Whetzel, H. H. The future of dusting. Trans. Penin. Hort. Soc. 38 (1924): 26-33. 1925.

49. Young, H. C., and R. C. Walton. Spray injury to apple. Phytopath. 15: 405-415. July 1925.

50. Zeller, S. M., and L. R. Childs. Perennial canker of apple trees. (A preliminary report.) Oregon Agr. Exp. Sta. Bul. 217: 1-17. Aug. 1925.

PEAR

The total production of pears in the United States in 1925 was 19,820,000 bushels compared to 18,868,000 bushels in 1924. The total value of the 1925 crop was $27,944,000.00 while that of 1924 was $26,693,000.00. In order of their production, the states ranked as follows in 1925: California, New York, Washington, Oregon, and New Jersey. The state of California produced more than twice as many pears as any other state.

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Blight is co-extensive with pear culture and for a long period of years it has been the most serious disease of this fruit in the United States. Weather conditions in 1925 appear to have been particularly favorable for development and spread of the causal organism on apples and pears. Blight was considerably more prevalent in 1925 than in 1924. Of the 26 states reporting, the disease was more prevalent in 11, the same in 10, and less in 5 states. Those reporting more were New York, Delaware, Alabama, Indiana, Illinois, Wisconsin, Iowa, Nebraska, Kansas, Oregon, and California. Compared to normal prevalence, 8 states reported more, 6 less, and 7 the same. The 8 states reporting more than normal prevalence were Alabama, Illinois, Wisconsin, Kansas, Oregon, California, and Kentucky.

The following figures indicate such losses as were reported by the various states:

PEAR - Blight

Table 58. Estimated losses from pear blight as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
25	Georgia, Alabama	4	Kansas
20	New York	3	Ohio
18	North Carolina	2	Texas
16	California	1.5	Delaware
15	Kentucky	1	Virginia
10	South Carolina, Iowa, Michigan, Illinois	.5	Connecticut
8	Maryland	trace	West Virginia, Maine, New Jersey, Wisconsin, Idaho

Dates and location of earliest reported appearance of blight, 1925

April 24	Urbana	Illinois	June 4	New Brunswick	New Jersey
April 25	Raleigh	North Carolina	June 10	Seaford	Delaware
May 1	Portsmouth	Virginia	July 10	Seabrook	New Hampshire
May 8	Lincoln	Nebraska	July 24	Hadlyme	Connecticut
May 19	Clemson College	South Carolina	August 19	Milwaukee	Wisconsin
May 21	Ulster County	New York			

We have the following reports from collaborators:

New York (Ontario County): Fireblight has taken an exceptionally heavy toll this year, wiping out quite a few pear orchards. (Burrell) (Yates County) - Mixed pear orchard including the Seckel pear practically ruined for this year. (Raymond)

Delaware: First observed June 10. Has developed more rapidly and general distribution is greater than on apple. Slight increase over last year. (Adams)

Georgia: Vigorous blossom and shoot blight in the spring. Only slow development after first week in April due to drouth of April and May. Renewed activity beginning the tenth of June in twig blight and canker forms. Fruit rot common but not severe. (Boyd)

Mississippi: Serious blossom blight in many localities; 15 and 20 per cent loss. (Neal)

Oklahoma: Not so destructive as last year on the pear. Quite plentiful on some varieties of apple. (Rolfs)

Ohio: Very destructive throughout Ohio this year. (Young)

Missouri: Particularly severe this past season. (Bregger)

PEAR - Blight

Nebraska: Much more prevalent and serious than last year. (Peltier)

Kansas: Unusually severe as blossom and twig blight this spring. Numerous reports from all over the state, especially the northeastern section and Arkansas Valley section, reported the disease as being present in practically 100 per cent of the orchards, especially the older ones where it was doing its worst damage. This year's crop was decidedly reduced due to blossom blight and next year's crop is handicapped already due to twig and spur blight. (White)

Washington: Excessive damage along the Snake and in the Yakima Valleys. It has been prevalent in the Walla Walla section on apples and pears but doing most damage to the latter. (Dept. Plant Path.)

Oregon: In the Milton-Freewater district practically all trees were affected according to R. F. Wilbur, fruit inspector. In Jackson County it has been reported more severe than for several years causing heavy loss. Of no consequence in the Hood River Valley. (Barss)

California: Disease so bad in some regions that thrifty eight-year old orchards were almost ruined. Some orchards didn't produce a crop. Disease occurred in foot-hill sections where it is not of usual occurrence. (Milbrath)

The important work of Nixon (2) showing transformation and migration of Bacillus amylovorus in the holdover cankers has already been mentioned under apple.

In California, according to Heppner (1), the demand for Japanese pear stocks has decreased considerably in favor of French stock. The change is traceable directly to pear blight.

According to Waite (3):

"Pear blight occasionally attacks the fruit of summer apples up to maturity but has never been found on mature winter apples or pears at harvest time or during winter storage, and under ordinary inoculation conditions the organism will not attack such fruit. The author shows, however, that under damp chamber conditions Bacillus amylovorus can attack the tissues of mature, winter apples, and also rose cuttings. Roses have never been found attacked by pear blight out of doors." (F. V. R. Bot. Abstr.)

Recent literature on pear blight (see also apple blight)

1. Heppner, M. J. Recent root stock developments. Amer. Fruit Grow. 45 (3): 10, 50. 1925.

2. Nixon, E. L. Migration and transformation of Bacillus amylovorus in apple tissue. Phytopath. 16: 77. 1926.

3. Waite, M. B. Pear blight infection of rose cuttings and of mature fruit. Official Rec. U. S. Dept. Agr. 4: p. 5. Aug. 1925.

PEAR - Scab

SCAB CAUSED BY VENTURIA PYRINA ADERH.

Compared with normal, and 1924 prevalence, pear scab was less important in 1925. Thirteen states reported it and among them, 4 reported more than in 1924, 6 less, and 3 the same. Those reporting more were New York, Oregon, California, and New Jersey. Only nine collaborators compared the 1925 prevalence with normal. Of these, one state, Oregon, reported more than normal, 5 less, and 3 the same.

It is quite apparent that the heaviest losses in the country occurred in California, Michigan, and Oregon.

Table 59. Estimated losses from pear scab as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	California	.5	New Jersey
2	Michigan	trace	New York, Virginia,
1.5	Connecticut		Maine, West Virginia, Georgia, Wisconsin, Iowa, Kentucky
1	Maryland, Alabama, Oregon, Ohio		

Dates and location of earliest reported appearance of scab, 1925

May 4	Dover	Delaware	July 24	Essex	Connecticut
May 15	Winchester	Virginia	August 19	Milwaukee	Wisconsin
June 29	Genesee County	New York	August 28	Middlesex	New Jersey

Delaware: Very slight infection this year. (Adams)

New York: Considerable on Flemish Beauty. (Chupp & Pierstorff)

Virginia: Only one case noted at Winchester on Seckel pears, May 15. (Schneiderhan)

Michigan: There has been very little scab present. Susceptible varieties even when unsprayed showed very small amount. (Bennett)

Oregon: Worse than it has been for several years due to prolonged spring rains and cool weather. (Barss)

Lane County - Very prevalent on most varieties. Loss on Bartletts 10 to 15 per cent; other varieties 15 to 20 per cent. In unsprayed orchards the losses are 75 to 80 per cent. (Stewart)

PEAR - Leafblight; Leafspot; Winter injury

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LEV.) ATK.

This disease has been particularly destructive in New Jersey, Delaware, and Maryland. It is known to occur wherever pears are grown, but in recent years the most serious losses have been reported from the Middle Atlantic States. This disease also was less prevalent in 1925 than normally or in 1924. No state reported greater prevalence of this disease than for normal, three states reported less, and Maryland, in which the disease seems to be particularly severe, reported the same. Leafblight appeared on May 13 in Delaware, May 10 in Virginia, and July 7 in New Jersey.

Massachusetts: A serious case of this disease on nursery stock was noted in Amherst. (Osmun & Davis)

Delaware: Where copper sprays were used only a trace of infection was found. Neglected trees showing defoliation on July 27, but much less than last year. (Adams)

Florida: Common over the northern section of the state. (Rhoades)

LEAFSPOT CAUSED BY MYCOSPHAERELLA SENTINA (FR.) SCHROET.

The reports on this disease indicate that it was less important this year than usual. From the standpoint of economic importance it ranks as a minor disease. In Virginia it is the commonest disease of pears, but the loss occasioned by it there is minor because pears are not grown extensively.

New York: Serious on neglected trees. (Chupp & Pierstorff)

Virginia: The commonest leaf disease of pears but of no great economic importance. (Schneiderhan)

Georgia: Less prevalent than last year. Probably due to drouth in April and May. (Boyd)

Michigan: Present in nearly all orchards but of no economic importance. (Bennett)

WINTER INJURY

Winter injury seems to have been particularly severe during the winter of 1924 and 1925.

Alabama: Considerable injury caused by trees going into dormancy in poor condition. (Miles & Blain)

PEAR - Winter injury; European canker; Blackrot

Illinois: Pears nearly all killed by low winter temperatures December 26, 27, and 28, 1924. (Anderson & Tehon)

Michigan: In some orchards more than 50 per cent of the fruit will show some form of frost marking. (Bennett)

Minnesota: Pears grown on fruit breeding farm severely injured during the winter. Several trees killed. (Dept. Plant Path.)

Idaho: Severe freeze of December 1924 caused very large amount of injury. (Hungerford)

EUROPEAN CANKER CAUSED BY NECTRIA GALLIGENA BRES.

European canker was reported from Washington and Oregon. In the latter state it was said to be very important and more severe than usual. It occurred in western Oregon including the Hood River Valley. Concerning the disease S. M. Zeller, of Oregon writes as follows:

"Always more serious in seasons following extreme cold, as in 1920 and this year. Thin-barked more susceptible than thick-barked varieties. According to prevalence observed Surprise, D'Anjou, Bosc, Howell, Bartlett most susceptible in order named. Few cases on Winter Nelis and Comice. In one orchard at Corvallis, in 96 trees of Oreille 8-1/3 per cent had trunks cankered, while of 408 trees of Surprise 33 per cent had cankered trunks.

"In 1922 a 3-year old orchard of 140 acres of Surprise near Grants Pass had 42 per cent of the trunks cankered. The disease was cut out according to the following recommendations and has not returned since.

"Control - 1. Where infection extends into the cambium it is cleaned out thoroughly.

"2. Cases of superficial canker are merely scarified.

"3. All cleaned wounds are coated with Bordeaux paste made up in raw linseed oil, using Sherwin-Williams "Fungi-Bordo" dust, stirring the oil into it until a thick paint is formed.

"4. Spray with Bordeaux 4-4-50 before first fall rains, and after leaf fall if possible (a large number of infections take place through fresh leaf scars), to prevent new infections. It is very important to spray before the fall rains."

Recent literature

1. Dillon Weston, W. A. R. A preliminary note on the perithecia of Nectria galligena. Ann. Appl. Biol. 12: 398-400. July 1925.

BLACKROT CAUSED BY PHYSALOSPORA MALORUM

No unusual reports of this disease occurred in 1925. The same general prevalence as in previous years was reported. Maryland reported 5 per cent loss.

MISCELLANEOUS DISEASES AND INJURIES

Black end (non-par.), Washington, California. From the latter state W. T. Horne reports the trouble increasing and rather widely distributed. It occurs largely on individual trees scattered through the orchards. According to Horne it seems to be worse on trees of Japanese stock in situations with fluctuating water conditions. Milbrath estimates 0.5 per cent loss in California on account of it. In Washington it was reported several times from the Yakima Valley.

Cercospora minima Tr. & Earle, leafspot, noted on sand pear at Gainesville, Florida.

Chlorosis due to excess of lime, Texas.

Corticium stevensii (Noack) Burt., hypochnose, Florida (defoliates trees and kills back the young limbs).

Gloeodes pomigena (Schw.) Colby (Phyllachora pomigena (Schw.) Sacc.) sooty blotch, Connecticut, New York.

Gloeosporium perennans Zeller & Childs, perennial canker, Oregon.

Gymnosporangium blasdaleanum (Diet. & Holw.) Kern, incense cedar rust, Oregon. "Not important, occurs in western Oregon, especially in Lane County, but is not a factor in the crop as a whole." (Barss)

Hendersonia foliorum Fckl., leafspot, Florida.

Ozonium omnivorum Shear, rootrot, Oklahoma, Texas.

Red leaf (non-par.), New York, fairly common on Kieffers.

Ring canker (undet.), California.

Septobasidium retiforme (Berk. & Curt.) Pat., canker, Florida, Texas. (Reported as Thelephora retiformis).

Recent literature on pear diseases

1. Hartman, Henry. The control of core break-down in pears. Oregon Agr. Exp. Sta. Bul. 216: 1-16. 1925.

2. Hendrickson, A. H. A chlorotic condition of pear trees. Proc. Amer. Soc. Hort. Sci. 21: 87-90. 1925. Also Blue Anchor 2: 6, 25-26. Nov. 1925.

3. Lipman, C. B., and A. Gordon. Further studies on new methods in the physiology and pathology of plants. Jour. Gen. Physiol. 7: 615-623. 1925. Chemical injections.

4. Milad, Y. The distribution of iron in chlorotic pear trees. Proc. Amer. Soc. Hort. Sci. 21: 93-98. 1925.

5. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables. (Abstract) Phytopath. 16: 73. Jan. 1926.

6. Rose, D. H., and C. C. Lindegren. Phytophthora rot of pears and apples. Jour. Agr. Res. 30: 463-468. Mar. 1, 1925.

PEAR - Miscellaneous Literature
QUINCE - Leafblight; Blight; Rust

7. Van Poeteren, N. Verslag over de Werkzaamheden van den Planteziektenkundigen Dienst in het jaar 1924. (Report of the activities of the Phytopathological Service in the year 1924.) Versl. en Meded. Plantenziektenkundigen Dienst te Wageningen 41: 62 pp. 1925.

QUINCE

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LÉV.) ATK.

Only six states reported on this disease. It was reported to be important in Connecticut where it occurred in greater prevalence than normally, and in New York the loss was estimated at 1 to 5 per cent. Defoliation followed a severe attack in certain parts of New York and Delaware.

Dates and location of earliest reported appearance of leafblight, 1925

April 14	Clemson College	South Carolina	July 20	Monroe County	New York
July	Seaford	Delaware	July 22	Wellingford	Connecticut

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Ten states reported on fireblight of quince. It is noteworthy that this organism affected quinces only slightly in 1925, while, as we have seen, it was the only disease of apples and pears which showed greater prevalence than normally. Only Massachusetts reported more blight on quince than in 1924. In that state, according to Davis, it was more prevalent on quince than on pear or apple. The only considerable losses reported were 10 per cent from Maryland and 3 to 5 per cent from New York.

Dates and location of earliest reported appearance of blight, 1925

May 20	Amherst	Massachusetts	June 14	Middlesex County	New Jersey
June 11	Georgetown	Delaware	June 22	LaPorte	Indiana

RUST CAUSED BY GYMNOSPORANGIUM GERMINALE (SCHW.) KERN

Quince rust was reported from six states, New Hampshire, Massachusetts, Connecticut, Maryland, Virginia, West Virginia, and Alabama. Maryland and Virginia reported normal amounts, while New Hampshire reported more than normal prevalence.

QUINCE - Rust; Miscellaneous Diseases; Literature
PEACH - Brownrot

Dates and location of earliest reported appearance of rust, 1925.

June 10	Durham	New Hampshire
June 19	Strasburg	Virginia
August 1	Saybrook	Connecticut

MISCELLANEOUS DISEASES AND INJURIES

Frost - Maryland (2 per cent loss). Michigan, fruit reduced to the extent of 40 per cent.

Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot, Connecticut.

Aerial galls, according to McClintock (1) aerial galls on quince are not crowngall but are similar to the "burr knots" described by Swingle (2) on apple and pear.

Recent literature

1. McClintock, J. A. Aerial galls of quince. (Abstract) Phytopath. 16: 78. Jan. 1925.

2. Swingle, C. F. Burr-knots of apple trees - its relation to crowngall and to vegetative propagation. Jour. Heredity 16: 312-320. 1925.

DISEASES OF STONE FRUITS

PEACH

The total peach production in 1925 was estimated to be 46,565,000 bushels compared with 54,119,000 bushels for 1924. The total value of the peach crop in 1925 was $65,086,000.00 compared with $68,679,000.00 in 1924. In the order of production in 1925, the states ranked as follows, California, Georgia, Arkansas, New York, and Texas. The state of California produced more than twice as many peaches as any other state.

Drouth and frost injury were very largely instrumental in reducing peach production in such states as Georgia, Virginia, Maryland, and West Virginia.

Fungous and bacterial diseases and other injuries of peaches were considerably less prevalent in 1925 than the year previous and normally. The total money loss due to diseases was very much less this year not only because of a lower average prevalence but also because the crop was comparatively small.

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM (S. AMERICANA (WORMALD) NORTON & EZEKIEL)

Brownrot of peaches was considerably less prevalent this year than in 1924 and normally. Only two states, Connecticut and New York, reported more

than in 1924. Of the other states, eight reported less, and six the same prevalence as in 1924. Two states, New Jersey and Delaware, reported more than normal prevalence, eight reported less, and five the same. We infer, therefore, that brownrot was of less importance this year than usually due, as mentioned in a number of reports, to dry weather.

Table 60. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	South Carolina	2.5	New York
7	Maryland	2	Virginia, Ohio
5	Arkansas, North Carolina, Michigan	1	Delaware, Indiana, Kansas, Alabama, Texas
4	New Jersey, Connecticut	.5	Georgia
3	Kentucky, New Mexico	trace	West Virginia, Illinois

California, which produces by far the largest crop of peaches in the United States, did not report any loss from brownrot.

As in previous years, this disease manifested itself chiefly in the form of twig blight and fruit rot. The first mentioned form was considerably less important this year than usual due to dry weather at the time of blooming.

Dates and location of earliest reported appearance of brownrot, 1925

February 17	Frogmore	South Carolina	June 2	Waite Co.	North Caroli
April 25	Burlington Co.	New Jersey	June 5	Dover	Delaware
May 15	Fort Valley	Georgia	July 28	Weatherfield	Connecticut
June 1	Dutchess Co.	New York	Sept. 10	Leesburg	Virginia

New Jersey: Severe blossom blight in some orchards. Heavy losses from fruit rot in others. (Martin)

Virginia: An unusually severe infection by brownrot was noted at Leesburg on Bilyeu variety. In spite of the fact that one block of these peaches was sprayed eight times with dry-mix and the other block was sprayed five times with dry-mix and then dusted with sulfur dust on August 25, September 17 and 24, the crop in this orchard was practically a total loss. Fruit infection to the extent of 35 per cent appeared before fruit was ripe. The drops in these blocks showed 100 per cent infection. A conservative estimate of total fruit infection is 80 per cent. This orchard was very severely infested in 1924 and unless the disease is checked by a pre-blossom spray and severe pruning, this entire block of trees will have to be destroyed because it is acting as the center of infection to the other peaches in the orchard, which is the largest in Virginia. (Schneiderhan)

Georgia (Fort Valley): Not commercially important due to dry weather throughout the growing season. Apothecia were first observed in orchards March 2. This date is probably four to six days late as

some of the apothecia had started to dry up. No apothecia found after March 14. Blossom blight with the accompanying twig cankers did not attain any commercial importance even on the very susceptible varieties such as Uneeda and Mayflower. The summer continued hot and dry, but on October 29, following a short period of rainy weather, abundant rot was noted on fruit in small orchards of late peaches. (Dunegan)

Florida: Common on mature fruit generally in the northern part of the state. (Rhoads)

Ohio: Causing quite considerable losses in home orchards. Very little of the disease is noted in commercial orchards. (Young)

Indiana: A serious outbreak occurred in a commercial orchard of Krummels in Knox County in September. This orchard had been thoroughly sprayed and the difficulty is attributed to the high percentage of growth cracks that occurred as a result of the September rains. (Gardner)

Oregon: Of some importance in the Willamette Valley especially on late fruit. (Barss)

According to the report of the Chief of the Bureau of Plant Industry (8) for the year ending June 30, 1925, the application of sulfur dust two or three weeks before picking time in Georgia has reduced the development of brownrot on peaches in transit in cases where rains were common during the picking season, but in drier weather, this dusting has been unnecessary and of little value. A delay of a few hours in cooling peaches makes a decided difference in the character and amount of the rots that develop later in transit. Brownrot spores lodged in cuts and bruises on the peach develop even at a temperature of 41° F. but spores on the surface of the peach seldom develop rot at this temperature. At 48° F. and higher spores dusted on the peaches caused a fairly rapid development of rot without the aid of cuts and bruises in the skin. Dusting peaches by the use of aeroplanes appears to be promising in Georgia.

Barss (1) has reported that much loss is experienced annually in orchards of the Pacific Northwest from western British Columbia to western Oregon and perhaps farther south, from blighting of blossoms and killing of spurs, and sometimes cankering and girdling of twigs and smaller branches, followed by a negligible amount of fruit rot, caused by a species of Monilia differing from that ordinarily reported as "Sclerotinia cinerea" to which the name Monilia oregonensis Barss & Posey has been given. The principal hosts attacked are apricots, sour and sweet cherries, prunes, peaches, and pears, and quince and apple fruit has been found infected. The fungus winters in the blighted parts. Apothecia were not found, and were not produced under conditions favorable for their formation in "S. cinerea."

Ezekiel (4) studied cultures of M. oregonensis received from Barss, and also of a fungus isolated from decayed peaches, cherries, and apricots sent from California by B. A. Rudolph, and reported that "These were compared with a large population of other single-spore cultures, also collected in this country, and now all assigned to S. americana, and with S. cinerea and S. fructigena cultures from England and Holland. Of the California and Oregon strains mentioned above, all except that on apricot were found to be true S. cinerea."

PEACH - Brownrot; Leafcurl

Recent literature on brownrot

1. Barss, H. P. Serious blossom blight in Pacific Northwest orchards due to a species of Monilia. (Abstract) Phytopath. 15: 126. 1925.

2. Brooks, C., and D. F. Fisher. Spraying for brownrot in the Northwest. Amer. Fruit Grow. Mag. 45 (6): 10, 25, 34. June 1925. Also Blue Anchor 2 (9): 18-19, 36-37. Sept. 1925.

3. Ezekiel, W. N. Fruit-rotting Sclerotinias II. The American brownrot fungi. Maryland Agr. Exp. Sta. Bul. 271: 87-142. Oct. 1924.

4. _____ Presence of the European brownrot fungus in America. Phytopath. 15: 535-542. 1925.

5. Haenseler, C. M. Plant diseases of New Jersey. Brownrot of stone fruits. New Jersey Agr. 7 (8): 6-7. Aug. 1925.

6. Muhleman, G. W. The pectinase of Sclerotinia cinerea. Bot. Gaz. 80: 325-330. Nov. 1925.

7. Schneiderhan, F. G., and R. H. Hurt. The dry-mix spray for peaches. Virginia Agr. Exp. Sta. Bul. 239: 1-16. Jan. 1925.

8. Taylor, W. A. Report of the Chief of the Bureau of Plant Industry 1925: 1-36. 1925. (Unnumbered report, U. S. Dept. Agr.)

LEAFCURL CAUSED BY EXOASCUS DEFORMANS (BERK.) FCKL.

Peach leafcurl is one of the best known and most widely distributed diseases of this fruit in the United States. The records show that there is no sharp geographical limitation to this disease, although certain states, particularly New York, Pennsylvania, Maryland, Michigan, and Oregon, have reported the greatest losses. The relation between cool, wet weather at the time of bud expansion and infection is well-known. Nothing new has been contributed in 1925 to the knowledge of this disease, although an excellent resumé of the whole subject has been given by Coons (1).

In 1925 leafcurl was considerably less prevalent than in the previous year and normally. Only three states, Delaware, Kansas, and California, reported a greater prevalence than 1924, while ten states reported less, and six the same prevalence as last year. Comparing this year's prevalence with normal only two states, Delaware and Kansas, reported more, eleven states reported less, and five the same as normal.

Losses resulting from peach leafcurl this year were not severe. The records of the past eight years indicate that crop losses to the extent of 20 per cent have been reported. This year the highest loss, 3 per cent, was reported from Kansas and Maryland. A number of reports, including those from Massachusetts, New Jersey, Delaware, Maryland, Virginia, Oregon, and California, stated that the disease was abundant in unsprayed or poorly sprayed orchards, or where spray was applied late.

PEACH - Leafcurl

Table 61. Estimated losses from leafcurl as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	Maryland, Kansas	trace	New York, West Virginia,
2	South Carolina, North Carolina, Oregon		Alabama, Illinois, Michigan, Maine, Kentucky, Oklahoma, Arkansas, Idaho
1.5	Delaware, Texas		
1	New Mexico, Michigan		
.5	New Jersey, Virginia, Ohio, California		

Dates and location of earliest reported appearance of leafcurl, 1925

April 14	Crozet	Virginia	May 6	Dutchess County	New York
April 14	Clemson College	South Carolina	May 15	Vineland	New Jersey
April 16	- - -	Delaware	June 1	- - -	New Hampshire
April 23	Orange County	Indiana			

Some interesting and informative reports were submitted by various collaborators. Among them the following are noteworthy.

Delaware: Injury noted on leaf and shoot. Was general throughout the state. Delay in putting on dormant spray favored greater general increase over last year. (Adams)

Illinois: No leafcurl was observed in the peach growing section this year in sprayed orchards regardless whether sprayed with oil-emulsion or lime-sulfur. (Anderson)

Kansas: Leafcurl is evidently more severe in the southeast part of the state than normally due to a very wet spring. Some defoliation has been reported as due to leafcurl. In general a dormant spray of lime-sulfur has given satisfactory control. (White)

Washington: Present in both eastern and western Washington, but less abundant than usual. Not in the central irrigated valleys. (Dept. Plant. Path.)

Oregon: General and serious wherever not controlled. Prolonged cool, wet spring. A grower in the Willamette Valley reports "Very bad in most orchards as the spraying was delayed due to rainy weather at spray time." Can be controlled perfectly by winter spraying with Bordeaux. Elberta is the only commercial variety severely affected by leafcurl, but this variety is quite largely grown. (Barss)

California: It appears now that fruit was affected. This was deformed. Growers sprayed too late on account of the rains. (Milbrath)

PEACH - Leafcurl; Scab

Recent literature on leafcurl

1. Coons, G. H. Old and new facts about peach leafcurl. Amer. Fruit Grow. 45 (2): 33, 46-47, 53. 1925.

2. Encke, F. von. Die Kräuselkrankheit des Pfirsichs. Deut. Obst- u. Gemüseb. Zeit. 71: 287-288. May 22, 1925.

3. Mix, A. J. The weather and peach leafcurl in eastern Kansas in 1924. Phytopath. 15: 244-245. 1925.

SCAB CAUSED BY CLADOSPORIUM CARPOPHILUM THUEM.

Scab appeared to be far less prevalent this year than usual, as indicated by the fact that only one state, Delaware, reported more of the disease than normal, while ten reported less, and two the same. The same figures are true of the comparison between the 1925 prevalence and that of 1924 with the exception that only Connecticut in addition to Delaware reported more scab.

Scab is probably easier to control in average seasons than any other fungous disease of the peach. The regular spray programs applied in 1925, aided by weather conditions distinctly unfavorable to the development and spread of the fungus, especially in the southern and eastern Appalachian section, resulted in a very low loss this year. The following table gives the losses reported.

Table 62. Estimated losses from scab as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
2	North Carolina	.75	Connecticut
1.5	Maryland, Georgia	.5	Virginia, New Jersey
1	Florida, Alabama, Delaware, Mississippi, Texas, Arkansas, Ohio	trace	New York, West Virginia, Michigan, Kansas

Dates and location of earliest reported appearance of scab, 1925

April 20	Burlington	New Jersey	July 2	Crozet	Virginia
April 23	Lawrence County	Indiana	July 22	Cherau	South Carolina
April 29	Bridgeville	Delaware	August 1	Westville	Connecticut
June 17	Powersville	Georgia	August 10	Green County	New York

A record of conidial development on cankered peach twigs at Crozet, Virginia, kept by Hurt, table 63, indicates that conidia are produced over a comparatively long period of time and after practically every rain.

PEACH - Scab; Bacterial spot

Table 63. Data concerning peach scab conidial production, Crozet, Virginia, 1925 (from R. H. Hurt).

Date	Extent of production	Rainfall (inches)
May 24	Light	0.19
June 6	Medium	0.27
June 24	Heavy	0.76
June 27	Heavy	0.85
July 6	Heavy	0.95
July 8	Heavy	0.68
July 9	Medium	0.39
August 4	Light	0.20
August 9	Heavy	0.75
August 10	Light	0.19
August 11	Heavy	0.55
August 12	Heavy	0.24
August 21	Light	0.11

Delaware: Heavy twig infection. Slight increase on fruit. (Adams)

Virginia: Unusually late in appearing. (Fromme)

North Carolina: Rather prevalent despite the drouth. (Fant)

Georgia (Fort Valley): Due to dry weather, scab was not commercially important except in neglected orchards. First evidence of disease seen on May 4 on Elbertas. On June 17 the disease was found on unsprayed seedlings near Powersville, Georgia. The spots on these fruits were fairly numerous. Later, July 8, it was found on commercial fruit at picking time in an orchard that had not been properly cared for. Numerous cankers on the twigs were probably the source of the infection. Following the first rains in October after a long dry period, numerous scab spots developed upon unsprayed foliage. The fungus was sporulating vigorously on the spots and cultures were readily obtained. Leaves bearing these spots could still be collected in the early part of November but at this time the spots were not as large nor as numerous although they were sporulating freely. (Dunegan)

Ohio: Scab is quite general throughout the central portion of the state, especially in unsprayed orchards. (Young)

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Compared to previous years, bacterial spot was very much less prevalent. Only two states, New York and Kansas, reported more shot-hole than in 1924, and only Kansas reported more than normal, while nine states reported less than normal, and eleven less than 1924.

PEACH - Bacterial spot

The losses in 1925 were not great, the heaviest reported being 5 per cent in North Carolina.

The accompanying table 64, gives the losses reported from the various states.

Table 64. Estimated losses from bacterial spot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	North Carolina	trace	New Jersey, Maryland,
1	Alabama, Texas, Kansas, New York		Virginia, Michigan, Iowa, Arizona
.5	Illinois		

In the states reporting losses, the Elberta and Hale varieties seem to have been the most susceptible.

Dates and location of earliest reported appearance of bacterial spot, 1925

April 29	Fort Valley	Georgia	June 26	Moore County	North Carolina
May 7	Lawrence County	Indiana	June 29	Orange County	New York
May 14	Bridgeville	Delaware	July 22	McBee	South Carolina
May 17	Winchester	Virginia	July 29	Bridgeton	New Jersey
May 29	Ozark	Illinois			

New York: Reported as rather general but it is difficult to determine how much was caused by this injury or by spraying. Heavy loss of foliage in a few orchards of Niagara County. (Chupp & Pierstorff)

Delaware: Defoliation at this time generally less than last year. Heavy twig infection found for the first time on Elberta, May 28. (Adams)

North Carolina: Shipping point inspectors report damage to Hales and Elbertas running as high as 30 per cent in some instances. (Fant)

Georgia: Due to dry season, this disease is of minor importance in Fort Valley belt. Initial infection could be attributed directly to bacteria overwintering on the twigs. First noted April 29. These spots on the fruit were small and contained practically pure cultures of the organism. No defoliation observed during the season. No twig cankers found on the 1925 wood. (Dunegan)

Oklahoma: Not plentiful as last year. Very little fruit injury by this organism during this season. Leaf infections more or less plentiful in most orchards. (Rolfs)

Indiana: Too dry in April and May. (Gardner)

PEACH - Bacterial spot

Illinois: Bacterial shot-hole appeared late this season due to the dry weather during the period when initial infection usually takes place. Defoliation in fertilized orchards was not as severe as in those not nitrated. Mainly on Elberta and Hale. Very little fruit infection and foliage inclined to hold better than usual. (Anderson & Tehon)

Kansas: Common and serious this year in Coffey County. Sixty-five to seventy-five per cent of twigs killed back as much as half of last year's growth. (White)

In 1925 an advance seems to have been made in the control of bacterial spot as a result of work done by Anderson (2) of Illinois. He reported as follows:

"Spraying experiments on peach for control of bacterial spot (shot-hole) during 1925 at Urbana, Illinois, demonstrated the possibility of control with a spray of sodium silicofluoride in water. Preliminary laboratory tests proved this substance effective in preventing growth in broth cultures in dilutions of 1-3,000. Seven applications were made, ten to fourteen days apart. Various concentrations were used. One containing two pounds in 50 gallons of water proved satisfactory. The checks showed from 10 to 90 per cent diseased leaves on October 1, while very few infections could be found on the sprayed trees. It is probable from the dates of infection that only three of the seven sprays would have been necessary for control. Sulfur sprays first gave increased infection over the checks, due probably to wetting the trees during spraying. Later the checks were more heavily infected. No injury to the foliage resulted from the use of the sodium silicofluoride, neither in the orchards nor in the greenhouse where preliminary tests were made. This season's weather conditions were so abnormal, however, that no assurance can be given that that injury will not result in other seasons. Copper sprays, including two brands of colloidal copper and Bordeaux mixture, caused serious spray injury."

The same author (3) also contributed the results of five years of investigation on the overwintering habits of Bacterium pruni under Illinois conditions, indicating that the pathogenic organism does not overwinter entirely in cankers on twigs as reported from other states but also on leaves. No difficulty was experienced in isolating the bacterium from leaves in the spring. The exact method of inoculation is not known but the author assumes that the bacteria occurring in the gelatinous masses are blown as dust to the green leaves and when moistened readily cause infection.

Recent literature on bacterial spot

1. Adams, J. F. The defoliation of peach trees in relation to spray materials and bacterial shot-hole. Trans. Penin. Hort. Soc. 38: 17-21. 1925.

2. Anderson, H. W. Control of bacterial spot of peach with sodium silicofluoride. (Abstract) Phytopath. 16: 79-80. Jan. 1926.

3. _____ Overwintering of Bacterium pruni. Phytopath. 16: 55-57. Jan. 1926.

4. _____ Shot-hole or bacterial spot of peach. Amer. Fruit Grow. Mag. 45 (2): 26, 38-39. 1925.

5. _____ Some observations on bacterial shot-hole of peach. Trans. Illinois State Hort. Soc. 58: 488-497. 1925.

6. Jehle, R. A. Black spot or bacterial crack of the peach. Trans. Penin. Hort. Soc. 38: 15-16. 1925.

BLIGHT CAUSED BY CORYNEUM BEIJERINCKII OUD.

Peach blight was reported from Ohio, Michigan, Colorado, Idaho, Washington, Oregon, and California. California reported a crop reduction of 3 per cent due to this disease, which is of more importance in the far western, than in the eastern and southern states. Other losses reported were Ohio, 1 per cent; and Michigan and Colorado, a trace.

Michigan: No varietal resistance noted. Five sprays as applied failed to give satisfactory control. (Bennett)

Idaho: Prevalent in Northern Idaho, especially where San Jose scale is present. The spray for that pest seems to control Coryneum blight. (Hungerford)

Washington: Known to occur in practically all sections of the state. (Dept. Plant Path.)

Oregon: Leaf, twig, and fruit spot; bud blight west of Cascades. Twenty per cent of stone fruits reported badly spotted in Rogue River Valley. Good control where sprayed. (Barss)

California: Found in central California in the cling peach district. The fungus was active much longer than usual. Found it active in May on new wood. (Milbrath)

Recent literature

1. Duruz, W. P. California peach blight or shot-hole fungus. Blue Anchor 2 (2): 15, 38. 1925.

YELLOWS (CAUSE UNDETERMINED)

From the 10 reports submitted we conclude that yellows occurred about as usual in most of the states, although in Ohio and Michigan it was reported in greater prevalence than normal. In New York it was reported occurring scatter-

ingly in Greene and Columbia Counties. Massachusetts reports the disease as becoming less important. In Michigan it was reported more prevalent this year than usual, occurring in such amounts as to assume the nature of an epiphytotic. Concerning the situation in that state, C. W. Bennett writes as follows:

> "I have spent about two weeks this summer visiting various orchards in which yellows is present and I think we can be very sure that yellows is present in quite a number of orchards in the state, (chiefly in Berrien and Van Buren Counties)--- A great many trees have been condemned by inspectors."

The question as to whether yellows is gradually disappearing is an important one. Accordingly collaborators in a number of states on the outer border of the original yellows area were asked as to whether or not yellows occurred in their states. The two negative replies from Indiana and Illinois follow:

> "We feel quite confident that peach yellows does not occur in Indiana at the present time. Neither Doctor Jackson nor I have ever seen any cases of the disease and I think we have been in most of the commercial peach orchards. Furthermore, the men in the Horticultural Department who know the commercial orchards from one end of the state to the other, assure me that there is none of the disease present and that there has not been any for a considerable period of time. It seems very strange that such a disease could disappear so completely, but nevertheless such seems to be the case." (Gardner)

Writing about peach yellows in Illinois, Anderson states:

> "I think I have been in every peach orchard in the state, of any size, and have seen them at various seasons of the year. I can say with the utmost confidence that peach yellows does not occur in this state and probably never has occurred with one possible exception. Professor Burrill reported peach yellows as appearing here at one time in the nineties, but while he saved specimens of this disease which indicate yellows, I am not satisfied that this was the real cause of the condition. I am quite sure that I am safe in saying that the disease has not occurred in Illinois during the last ten years."

Table 65. Estimated losses from yellows as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
2	Maryland, New Jersey	.25	Delaware
1	Connecticut, Ohio	trace	Massachusetts, New York,
.5	Michigan		Virginia, West Virginia

Yellows was reported from Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, West Virginia, Virginia, Ohio, and Michigan. No reports were received from Pennsylvania but it is known to exist there. It was noted July 24 at Hadlyme, Connecticut, and on July 6 in Greene County, New York.

PEACH - Little Peach; Spray injury

LITTLE PEACH

Little peach was reported from Michigan, New York, New Jersey, Delaware, and Maryland. In Michigan it was said to be of considerable importance locally, occurring chiefly in the west central part of state.

SPRAY INJURY

If there is one particular phase of spray information that needs clarifying it is the spray injury problem. Fundamental research is necessary to establish both the particular set of weather, chemical, and other factors combining to cause spray injury; and also the especial features of arsenical, lime-sulfur, and other types, of which we have only a hazy and indefinite conception at present.

Peaches are particularly susceptible and in the aggregate great losses result in the United States each year. In 1925, apparently, a smaller amount occurred than last year.

New Jersey: Where the amount of lead arsenate in dry-mix was reduced to one pound, only slight injury was observed. (Dept. Plant Path.)

Delaware: Spray injury observed May 22 as typical spotting and marginal burning. Cold, wet weather has predisposed leaves to injury. Dust injury very slight when applied during day compared with night dusting. (Adams)

South Carolina: "Sulphocide" at the rate of 3/4 gallons to 150 gallons of water applied to Mayflower peach resulted in spotting and reddening of leaves around patches of spray residue. Later, many of the spots fell out leaving a shot-hole effect. (Ludwig)

Indiana: Bordeaux sprays applied April 9, 23, and May 6 resulted in shot-hole effect on leaves. Injury was apparent June 5. (Gardner)

Farley (1) presents certain recommendations among which are the following:

1. Lead arsenate alone or in combination with lime should never be applied to growing peach trees.

2. One pound of powdered lead arsenate to 50 gallons of standard dry-mix is the maximum compatible with safety during growing season.

3. Hydrated lime containing 90 per cent or more of calcium oxide should be used in preparing dry-mix.

4. Great care must be exercised in weighing ingredients before mixing them in the spray tank.

Recent literature

1. Farley, Arthur J. Spray injury to peaches. Amer. Fruit Grower 45 (6): 12, 15. 1925.

WINTER AND FROST INJURY

The same serious aspect of frost injury and freezing of buds discussed under this heading for apple injury, holds true for peaches. There can be no doubt that whenever frost injury is general the total aggregate losses are greater than from any other single cause. This fact is brought out clearly in the 1925 report on frost injury of peaches. Percentage losses reported were Maryland, 75 per cent; Virginia, 90 per cent; West Virginia, 99 per cent; Michigan, 65 per cent; and Iowa, 50 per cent; while reports from other states not giving definite estimates indicate severe injury.

Delaware: Blossoms killed on April 7; temperature Sussex County 29° F. The percentage losses to different varieties in Kent County were as follows: Elberta, 50 per cent; Carman, 40 per cent; Georgia Belle, 50 per cent. (Adams)

Arkansas: Blossom injury in northern counties cut down yield enormously. (Dept. Plant Path.)

Illinois: Temperature of 8 to 20 degrees below zero killed fruit buds except in extreme southern section of the state. (Anderson & Tehon)

Michigan: Blossoms killed by late frost; most severe in Berrien County. (Bennett)

Utah: Utah was hard hit by the cold weather last winter and while a few favored spots will have a fair crop the damage the state over is very severe. (Kingsbury)

Idaho: Fifty per cent of the trees in the state killed by severe frost of December 1924. (Hungerford)

Colorado: At Palisades near Grand Junction, Colorado, there were heavy losses in peach orchards due to excessively low temperatures of the preceding winter. The weak trees suffered more than the vigorous ones. (Brooks)

MISCELLANEOUS DISEASES AND INJURIES

Armillaria mellea (Vahl.) Quel., rootrot, Texas (trace).

Bacterium tumefaciens EFS. & Town., crowngall, Texas (quite prevalent), New Mexico (slight importance), South Carolina (serious in most old orchards and nurseries), Arizona (2 per cent loss). In Georgia O. C. Boyd reported as follows: "Several orchards of Hiley, Georgia Belle, and Elberta in Mitchell and Dougherty Counties beginning to lose foliage due to the disease; trees 3 to 8 years old. One orchard, 5 per cent of trees lost."

PEACH - Miscellaneous Diseases; Literature

Cercosporella ~~persica~~ persicae Sacc., frosty mildew was reported from Florida and Georgia.

Clitocybe monadelpha (Morg.) Sacc., rootrot, Oklahoma (considerable loss in southern part of state on newly cleared land).

Diplodia natalensis Ev., footrot, Florida (not common on peach but caused considerable damage as a footrot of young trees and a limb blight of older trees).

Fusarium spp., rot, California (5).

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), root knot, South Carolina (common).

Phoma persicae Sacc., canker, Delaware.

Ozonium omnivorum Shear, Texas rootrot, Texas (trace; unimportant), Arizona (4 per cent loss).

Rhizopus nigricans Ehr., Rhizopus rot. Common rot in transit and during marketing (2).

Sphaerotheca pannosa (Wallr.) Lév., powdery mildew. Of minor importance in Oregon, Texas, and New York.

Valsa leucostoma (Pers.) Fr., dieback, Missouri.

An undetermined leaf and twig blight associated with Fusarium and Rhynchosporium proved troublesome in Coffee and Cherokee Counties, Kansas, according to R. P. White.

Chlorosis (non-par.), Texas, New Mexico (extremely common this year. Apparently securing at least temporary relief by the use of iron sulfate).

Mottle leaf (undet.), New Jersey (not serious, trace injury, observed in Monmouth and Cape May Counties).

Phoney disease, The phoney disease of peaches in Georgia has been increasing in severity. The diseased trees in the old infested areas have increased and the general area has extended quite widely year by year but, so far as known, has not spread beyond the state of Georgia. At the present rate of progress, however, it may be expected to reach other states in a very few years. The results of all experiments to control this trouble have been astonishingly negative. A tree once affected always continues to be diseased. The absence of any effect of soils, fertilizers, or other treatment points away from physiological or nutritional types of disease. This trouble, therefore, stands out distinctly as the least understood of all fruit diseases, if not of all plant diseases. (Rept. of the Chief, Bureau of Plant Industry to the Secretary of Agriculture for the fiscal year ended June 30, 1925).

Recent literature on peach diseases

1. Adams, J. F. The leaf-scar lesions on peach trees. Trans. Penin. Hort. Soc. 38 (1924): 22-24. 1925.

2. Anderson, H. W. Rhizopus rot of peaches. Phytopath. 15: 122-124. Feb. 1925.

3. Briton-Jones, H. R. On the diseases known as 'bark canker' and die back in fruit trees. Jour. Pomol. & Hort. Sci. 4: 162-183. 1925.

4. Eddy, E. D. A storage rot of peaches caused by a new species of Choanephora. Phytopath. 15: 607-610. Oct. 1925.

5. McClintock, J. A. Uncongenialty a limiting factor in the use of disease resistant stock. Proc. Amer. Soc. Hort. Sci. 21: 319-320. 1925.

PEACH - Miscellaneous Literature
PLUM and PRUNE - Brownrot

6. Plakidas, A. G. Fusarium rot of the peach. Phytopath. 15: 92-98. Feb. 1925.

7. Roberts, J. W. Unusual defoliation of peach trees due to active chlorine. U. S. Dept. Agr. Off. Rec. 4 (33): 5. Aug. 1925.

8. Smith, R. E. and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

9. Tryon, H. Gumming of drupaceous fruit trees. Queensland Agr. Jour. 24: 120-122. Aug. 1925.

PLUM AND PRUNE

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM. (S. AMERICANA) (WORMALD) NORTON & EZEKIEL

Although slightly less in the aggregate than in 1924 and normally, brownrot of plums was, as usual, an important economic factor. Twenty-two states reported on brownrot and of these, only three, Massachusetts, Connecticut, and Oregon reported more of the disease than in 1924, while six states reported less, and the remainder the same prevalence as 1924. Massachusetts, Delaware, and Oregon reported more brownrot than in average years. New Jersey, West Virginia, Arkansas, Ohio, and Michigan reported less, while Connecticut, Maryland, Alabama, Louisiana, North Dakota, Kansas, and New Mexico reported the same prevalence as in average years. The losses reported by the collaborators for 1925 were as follows:

Table 66. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Ohio	1	Kansas, West Virginia,
8	Wisconsin		Georgia
7	New York, Maryland	.5	Delaware, Texas
5	Connecticut, New Jersey, Michigan	trace	Virginia, Maine, Minnesota, North Dakota,
4	Kentucky		California, Arkansas.
2	New Mexico		

Dates and location of earliest reported appearance of brownrot, 1925

May 1	Newark	Delaware	August 10	Middlesex	New Jersey
May 13	Douglas County	Oregon	August 25	Madison	Wisconsin
July 24	Hadlyme	Connecticut	August 31	Steel County	Minnesota

Oklahoma: Quite plentiful in eastern Oklahoma. Not so abundant in western Oklahoma this year. (Rolfs)

Ohio: Outbreaks are apparently common now owing to the recent rains and to the fact that plums are ripening. (Hesler)

Minnesota: Sapa and Opata varieties found very susceptible to brownrot. (Sect. Plant Path.)

North Dakota: Plum and sand cherry hybrids very susceptible. (Brentzel)

Oregon: Very severe in early part of season; general but not serious at harvest time. In some orchards of Petites at least 50 per cent of the green fruit was attacked during May. Present to a slight extent in Italians also. Over 95 per cent of the prunes grown in Oregon are Italian prunes. (Barss)

Recent literature on brownrot (see also under peach)

1. Lees, A. H., and H. R. Britton-Jones. Plum aphis and brownrot control. Jour. Pomol. & Hort. Sci. 4: 196-199. June 1925.

2. Willaman, J. J., N. C. Fervier, and H. O. Triebold. Biochemistry of plant diseases. V. Relation between susceptibility to brownrot in plums and physical and chemical properties. Bot. Gaz. 80: 131-144. Oct. 1925.

BLACK KNOT CAUSED BY PLOWRIGHTIA MORBOSA (SCHW.) SACC.

This disease was not reported as serious in any state this year. In most cases it was said to be of very slight importance, although common in neglected orchards or on wild plum.

Table 67. Estimated losses from black knot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	New Mexico	.5	Michigan
2	New York, West Virginia	trace	Virginia, Texas, Illinois, Iowa
1	Maryland		

PLUM - Leafspot; Pockets; Bacterial spot

LEAFSPOT CAUSED BY COCCOMYCES PRUNOPHORAE HIG.

Of six states reporting on leafspot of plum, four indicated less prevalence than normal. The disease was of no economic importance this year, the highest loss reported being a trace to 2 per cent from New York. New Jersey, Maryland, and Michigan reported a trace of loss. In Alabama it was seen on wild plums, causing defoliation.

POCKETS CAUSED BY EXOASCUS PRUNI FCKL. AND E. COMMUNIS SADEB.

These diseases were reported from Maryland (trace), West Virginia (merely observed), Florida (very common on wild plums wherever grown; 100 per cent fruit infected in many cases), Texas (very prevalent due to cold, late spring), Michigan (of little importance), Wisconsin (same as usual, mostly in northern counties, of major importance on American plums in northern Wisconsin), Minnesota (unimportant, plums were almost a complete failure on account of frost), North Dakota (not as common as usual, wild plums, choke cherries and hybrids of these are very susceptible), Nebraska (considerable), Kansas (on wild plum mostly, one report on cultivated plum), New Mexico (same as usual, slight importance).

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot was reported to be unimportant on plum, the only loss estimate greater than a trace being one-half per cent in Texas.

New York: Never very important. Although reported repeatedly as general, it is difficult to determine how much is this disease, and how much is spray injury or Coccomyces. (Chupp & Pierstorff)

Georgia: This disease did not assume any commercial importance in the few plum orchards in the Fort Valley section. One orchard, which in 1924 had 85 per cent of the trees showing dead or dying twigs caused by this organism, had only a slight infection in 1925 and no dead twigs due to girdling by cankers. (Dunegan)

Oklahoma: The foliage and twigs of all the Japanese varieties are more or less infected. Foliage injury not so marked as last season. (Rolfs)

Minnesota: Found on Red Wing plums only. Leaves only affected. No fruit on trees because of frost. (Sect. Plant Path.)

Other states reporting its occurrence on plum are Delaware, Maryland, Alabama, Louisiana, Arkansas, Ohio, and Michigan. An interesting report on the relative susceptibility of plum varieties in the variety orchard of the Ohio Experiment Station was prepared by Hesler (Pl. Dis. Reporter 7: 86-88. Sept. 15, 1925). The only variety particularly susceptible to infection on leaves, twigs, and fruits was "Gee Whiz". None of the best commercial Domestica plums

were susceptible, with the exception of Coates Improved French prune, which showed heavy infection on fruit pedicels. The commercial imported Damsons were also free of the disease. The triflora plums, Shiro and Burbank, were the only commercially valuable varieties that showed high susceptibility.

WINTER AND FROST INJURY

The states of Delaware, Maryland, Michigan, Wisconsin, Minnesota, Iowa, and South Dakota report great reduction in the crop due to killing of the blossoms by late frosts. In some of these states this injury was a limiting factor in crop production. For instance, in Maryland the loss was thought to be about 90 per cent due to killing of young fruits by a May freeze. In Michigan 40 per cent loss on account of late frost occurred, while in Minnesota and Iowa 90 and 50 per cent loss was estimated respectively. The crop was practically a total failure in Minnesota.

Idaho: We found considerable winter injury on prunes in the Payette and Boise Valleys. The location of the injury was usually on the south side of the trunk or in the crotch and often extended from the ground line up to the lower branches and in some cases the exposed branches were also affected. In some instances the general growth conditions of the tree did not seem to have been affected, but in others, the branches immediately above the injury were dying. A Cytospora was present on some of the injured areas.(Brooks)

Washington: Italian prunes in the Walla Walla section particularly and also more or less generally over eastern and central Washington have shown a particularly heavy drop at the time the fruits were nearly full grown. Many of the fruits not dropping showed drought spot or gum spot in the flesh of the fruit. The condition was analyzed to be largely the result of severe winter injury to the trees during December 1924. This delayed effect of winter injury reduced the yield of marketable fruit to a small fraction of what was expected by growers. Injury was also apparent on the tree in the form of delayed effect of injury to twigs and branches. On the branches the progressive effect of winter injury became evident after the advent of dry, hot weather. On those branches where this progressive yellowing and death took place the entire set of fruit either dropped off or was of such poor quality as to be of no value. This delayed effect of winter injury coupled with the reduced set of fruit caused by spring frosts was a severe blow to the industry in the affected regions. (Dept. Plant Path.)

DROUGHT INJURY

Leafroll and fruit drop, of unknown cause but probably due to lack of moisture, was more severe than for the last five years in Idaho, according to Hungerford.

Leafrolling and dropping due to excessive transpiration and drought following a cool,wet spring was more important than usual in Oregon. It does not

usually occur in the irrigated sections of the eastern part, but in 1925 it was general throughout the state. Barss said that injury to growth and fruit setting is expected to show up next spring.

Gum spot of fruit was general and very important in both eastern and western Oregon. Its occurrence is unusual in irrigated sections in eastern Oregon, where it showed up this year. It was especially bad in the Milton-Freewater district, where 80 to 85 per cent of the prunes were graded second grade due to this trouble. (Barss)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., rootrot, Oregon (general in western part on old oak land).

Bacterium tumefaciens EFS. & Town., crowngall, Florida (on nursery stock), Oregon (probably general but only locally important).

Fumago vagans Pers., sooty mold, Washington.

Ozonium omnivorum Shear, rootrot, Arizona (1 per cent loss).

Podosphaera oxyacanthae (DC.) DBy., powdery mildew, Florida (causing serious twig blight on growing trees).

Tranzschelia punctata (Pers.) Arth., rust, Florida, Texas, California, and Oregon. In Florida it was collected on wild plants near Gainesville on which it caused defoliation in the late summer. In Oregon, according to H. P. Barss, in one four-year old orchard this disease caused bad defoliation in Date prunes, as much as 75 per cent in spots, while Italians alongside were not badly affected. In another orchard in the same county, however, Italians were seriously affected. In California, Milbrath reports it in the central and northern parts of the state causing a loss estimated at 0.5 per cent.

Valsa leucostoma (Pers.) Fr., dieback, Texas, Missouri, Kansas.

Black-end (non-par.), Washington.

Chlorosis (too much lime), Texas (traces).

Rough bark disease (non-par.), Washington (on Italian prune).

Leafspot (non-par.), Washington (Yakima Co.)

Recent literature on plum diseases

1. Ducomet, V. La rouille du prunier. Rev. Path. Vég. & Entom. Agr. 11: 262-267. Oct.-Dec. 1924.

2. Entomologists and plant pathologists of the Agricultural Experiment Stations and Colleges of Agriculture. Spray Calendars for various sections of the country. Amer. Fruit. Grow. Mag. 45 (2): Feb. 1925.

3. Mix, A. J. Biological and cultural studies of Exoascus mirabilis. Phytopath. 15: 214-222. 1925.

4. Smith, R. E., and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

CHERRY

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM (S. AMERICANA (WORMALD) NORTON & EZEKIEL)

This disease seemed to be of comparatively slight importance in most of the cherry producing states this year. Only Indiana and Oregon reported greater than average prevalence.

The losses from brownrot of cherries for 1925 were reported as follows:

Table 68. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	California, Maryland	1.5	New York
5	Michigan	1	Ohio, Illinois
4	New Jersey	.5	Wisconsin
3	Connecticut, Oregon	.25	Delaware
2	New Mexico, South Carolina, Virginia, Arkansas	trace	West Virginia, Iowa, Maine, Kentucky

New York: Better control measures this year because canners brought pressure to bear on the growers. (Chupp & Pierstorff)

Arkansas: No blossom blight has ever been noted in Arkansas. (Dept. Plant Path.)

Indiana: Serious fruit rot in southern Indiana; 10 to 15 per cent incidence reported in a car from Floyd County inspected by United States inspectors. (Gardner)

Kansas: Found on small green cherries. Unusual. (White)

Oregon: Abundant blossom blight and severe rot of green and ripened fruit. Spraying not a general practice for this disease. Weather very favorable. Dry, hot weather in late June and July checked the outbreak somewhat. (Barss)

California: Very bad. Occurred in all cherry districts, causing loss of 10 per cent. Disease followed spring rains. (Milbrath)

According to Brooks and Fisher (1) spraying for the control of brownrot in the northwest cherry sections has been very successful. The disease is said to be one of the most serious problems in successful cherry growing and marketing in that section.

CHERRY - Leafspot

Recent literature

1. Brooks, Charles and D. F. Fisher. Spraying for brownrot control in the Northwest. Amer. Fruit Grow. 45 (6): 10, 25, 34. 1925.

LEAFSPOT CAUSED BY COCCOMYCES HIEMALIS HIG.

Of the 16 states reporting on leafspot, 11 reported less than normal prevalence, while Connecticut and Oregon reported more than usual. Dry weather was mentioned, in many cases, as the cause of the reduced amount of leafspot.

Table 69. Estimated losses from leafspot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Maryland	.5	New York, New Jersey, Ohio, Illinois, Wisconsin
5	Michigan, Iowa		
2	Kentucky		
1	Kansas, Virginia	trace	Delaware, West Virginia, Arkansas

New Jersey: Not important this year. Appeared late in the season. The weather was hot and dry at picking time and consequently the disease was not severe. (Martin)

Florida: Leafspot was apparently in all sections of the state where host plant grew. It was of little importance, however. (Weber)

Michigan: Of some importance locally; minor in the southern half of the state, but heavy, late infection in northern half. Late infection result of dews. Temperature relatively high during the period of infection. (Bennett)

Wisconsin: Leafspot is not feared by leading cherry growers because it is so well kept under control by spraying. Lime sulfur and arsenate of lead applied wet is a general practice. Some minor dusting is being tried out. (Vaughan)

Missouri: Much damage to unsprayed trees which were often defoliated. (Maneval)

Nebraska: Common and severe. (Goss)

Kansas: Checked by proper spraying with bordeaux or lime-sulfur. (White)

Oregon: Unusually abundant in western Oregon; caused much damage to small crop of sweet cherries set. Attacked pedicels, as well as leaves, and caused shrivelling of fruit. Long, cool, wet spring. (Barss)

CHERRY - Leafspot; Frost injury; Winter injury

Observations on leafspot in Wisconsin (2) show infection is caused by spores discharged about June 15. In cool, moist weather the spray program will hold the disease in check.

Dutton and Wells (1) give a brief description of the disease and some data as to its effect on yield and growth of trees. Trees defoliated in previous years were found to produce relatively few small blossoms. The total production and the vigor of the trees following defoliation were greatly reduced. In the control investigations, the authors found that Pyrox could not be used satisfactorily on cherries because of serious foliage injury. Lime-sulfur is satisfactory for control, caused no foliage injury and did not reduce the size of the fruit. The authors recommend liquid lime-sulfur diluted at the rate of three gallons to a hundred for the control of leafspot on sour cherries in Michigan.

Recent literature

1. Dutton, W. C., and H. M. Wells. Cherry leafspot: Residual effects and control. Michigan Agr. Exp. Sta. Bul. 147: 3-15. 1925.

2. Russel, H. L., F. B. Morrison, and W. H. Ebling. Plant disease investigations of the Wisconsin Station. In (Annual Report of Director) Wisconsin Agr. Exp. Sta. Bul. 373: 5-16. 1925.

FROST INJURY

Considerably more than normal frost injury was reported from Delaware, Maryland, Virginia, Illinois, Michigan, Wisconsin, Iowa, and Idaho. High losses were reported from some of these states as indicated by the following table:

Table 70. Estimated losses from frost as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
90	Maryland, Virginia	25	Wisconsin
80	Iowa	12	New Mexico
50	Michigan		

WINTER INJURY

Washington: Cherries in all parts of the state were severely injured by the sudden drop in temperature which occurred in December. Some trees were killed outright, but others were injured so that parts have continued to succumb at various times as the season progresses. (Dept. Plant Path.)

MISCELLANEOUS DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., rootrot, Washington.

Blight reported from Michigan and Kansas. Bacillus amylovorus was isolated from the Kansas material in Kansas. A letter from Bennett of Michigan reports as follows: "Your may be interested to know that we found considerable fireblight on cherry fruits in Michigan this summer. I have isolated the organism and have obtained typical fireblight on apple and pear fruits and on apple twigs, so that I think there is very little doubt but that the cherry spot was caused by Bacillus amylovorus."

Bacterium cerasi Griffin, bacterial gummosis was unusually severe on sweet cherries in Oregon, according to Barss, "The results of this disease seem to be unusually severe this season. In the first place the extreme low temperatures (below zero) of the last Christmas season may have accelerated the canker and girdling activity of the bacteria attacking tree bodies of sweet cherries. In the second place the cool, moist spring seemed to provide an unusual amount of spur blight and leafspotting. These leafspot areas are often large. They frequently drop out and leave a lacy effect on the trees."

Barss (1) says that this disease is the greatest problem in young sweet cherry orchards in Oregon and Washington. Sour cherries are not attacked.

Bacterium pruni EFS., bacterial spot, New York.

Bacterium tumefaciens EFS. & Town., crowngall, Washington.

Cercospora cerasella Sacc., leafspot, Florida.

Cladosporium carpophilum Thuem., scab, Iowa.

Exoascus ceraci (Fckl.) Sadeb., witches' broom, Washington, Oregon.

Podosphaera oxyacanthae (Fr.) D By., powdery mildew, was reported to be more prevalent in New Jersey than usual, causing 5 per cent loss in Iowa, and present, but of no importance, in Connecticut and New York

An undetermined powdery mildew was reported for the first time on cherries in Minnesota. "Powdery mildew stunting Sand cherry and Zumbra cherry in nursery rows at Owatonna. Not on other varieties." (Div. Plant Path.)

Arsenical injury caused considerable loss on Morellos in New York. According to Chupp and Pierstorff the canners served notice on the growers this spring that unless the cherries were sprayed well enough to keep the maggot down to 1 per cent or less the crop would not be accepted. Consequently, many growers used too much arsenic and caused serious injury on ripening Morello fruit. In one large orchard in Niagara County where the grower put on too heavy applications, from 5 to 50 per cent of the fruit on different trees was destroyed. Similar injury was reported from Orleans, Monroe, and Wayne Counties.

Gummosis (Undet.) was reported on Schmidt sweet cherries in Ontario County, New York; and Washington.

Leaf crinkle (cause unknown, probably soil deficiency), Idaho (noted in several orchards in Lewiston region. Leaves have somewhat the appearance of mosaic infected plants).

A physiological trouble of sour cherries in reported by Frank from western Washington as very abundant on Montmorency, less abundant on Morello, in dry seasons. The fruit is glassy, bitter tasting, and may be brown inside. (Dept. Plant Path.)

Tranzschelia punctata (Pers.) Arth., rust, South Carolina.

Recent literature on cherry diseases

1. Barss, H. P. Avoidance of bacterial gummosis of cherry. Better Fruit 19 (7): 7. Jan. 1925.

2. Brown, W. H. The cherry in New South Wales. A discussion of the problems. Agr. Gaz. New South Wales 36: 121-134, 199-208. 1925.

3. Marre, F. Le Botrytis des cerisiers. Jour. Agr. Prat. 43: 17-18. Jan. 3, 1925.

APRICOT

Blight, said to be due to Bacillus amylovorus (Burr.) Trev., was reported from Florida and Texas.

Bacterial spot due to Bacterium pruni EFS. was reported from Texas.

Crowngall due to Bacterium tumefaciens EFS. & Town. caused a loss estimated at 1.5 per cent in Arizona, according to Streets.

Scab caused by Cladosporium carpophilum Thuem. was reported from Texas (loss one-half per cent).

Blight caused by Coryneum beijerinckii Oud. was said by Hungerford to be, as usual, the most important disease of apricots in Idaho. It was general and destructive in California, according to Milbrath, who estimated a loss of 6 per cent.

Rootknot caused by Heterodera radicicola (Greef) Muell., (Caconema radicicola (Greef) Cobb), was reported from Arizona (caused the death of a young apricot tree near Phoenix).

Rootrot caused by Ozonium omnivorum Shear killed about one per cent of the trees in the southern half of Arizona (Streets).

Blossom and twig blight caused by Sclerotinia fructicola Rehm (S. americana (Wormald) Norton & Ezekiel) was an important factor in the Santa Clara, Sacramento, and San Joaquin Valleys of California, according to Milbrath, who estimated a loss of 5 per cent. Rudolph (5) states that the Monilia blossom blight of apricots has become increasingly destructive in California in recent years, due most probably to extensive planting of susceptible varieties. In favorable seasons it may be followed by fruit rot. The Sclerotinia stage is very rare in California. Control is difficult, but may be attained by successive spraying with Bordeaux 8-8-50. Sulfur compounds should not be used, since the apricot is exceedingly liable to sulfur injury.

Green fruit rot caused by Sclerotinia sclerotiorum (Lib.) Mass. caused considerable loss in some orchards in California. The reduction in yield for the state was estimated by Milbrath at one-half per cent.

Black heart caused by Verticillium sp. (? alboatrum Reinke & Berth.) "A considerable factor throughout California; loss .2 per cent. There seems to be some correlation between potato and fruit tree infection by Verticillium." (Milbrath)

Fruit spot (undet.) was reported from Kansas. "Alternaria and Venturia spores in lesions. Looks like scab spots. Lesions brown, sunken, firm at first. Later they become larger, more sunken, and softer." (White)

Recent literature on apricot diseases

1. Anon. Peach blight, shot-hole fungus, and the peach twig borer. Blue Anchor 2 (11): 16, 33. Nov. 1925.

2. Entomologists and plant pathologists of the agricultural experiment stations and colleges of agriculture. Spray calendars for various sections of the country. Amer. Fruit Grower Mag. 45 (2). Feb. 1925.

3. Hoerner, G. R. Advances achieved in orchard dusting. Better Fruit 19 (8): 14-15, 18. Feb. 1925.

4. Nicholls, W. H. Apricot growing. Diseases. Jour. Dept. Agr. Victoria 23: 105-108. Feb. 1925.

5. Rudolph, B. A. Monilia blossom blight (brown rot) of apricots. California Agr. Exp. Sta. Bul. 383: 1-55. Feb. 1925.

6. Smith, R. E., and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

DISEASES OF SMALL FRUITS

GRAPE

The total grape production in the United States in 1925 was 1,967,160 tons compared to 1,763,742 tons in 1924. The total crop value in 1925 was $66,969,323.00 while that of 1924 was $73,227,580.00. In the order of production the states ranked as follows in 1925, California, New York, Michigan, Ohio, and Pennsylvania.

The survey of the various diseases which have caused economic losses to the grape crop indicates that in 1925 the loss from fungous injury and other causes was considerably below normal.

BLACKROT CAUSED BY GUIGNARDIA BIDWELLII (ELL.) VIALA & RAVAZ

Of the states reporting on blackrot of grapes in 1925 only one reported greater prevalence than in 1924 or normally. This is a very exceptional record for blackrot, which, for a long period of years has been the most important disease of grapes in the eastern United States. Eleven out of eighteen states reported less than average prevalence. The only states from which reports of serious injury were received were Maryland, Kentucky, and South Carolina. The losses reported are given in table 71.

GRAPE - Blackrot

Table 71. Estimated losses from blackrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Maryland	3	Delaware, Alabama
8	Kentucky	2	New Mexico
7	Virginia	1	West Virginia
5	South Carolina, Mississippi, Georgia, Idaho, Texas	.5	Ohio, Illinois, Connecticut
4	North Carolina	trace	Arkansas, Wisconsin, Kansas, New York

Dates and location of earliest reported appearance of blackrot, 1925

June 9	Westminster	South Carolina	June 22	Erie County	New York
June 15	Thomas	Georgia	July 12	New Brunswick	New Jersey
June 22	Newark	Delaware	July 21	Westford	Connecticut

Virginia: The only disease of economic importance this season on Muscatine grapes in Tidewater region. (McWhorter)

North Carolina: Less prevalent on account of dry weather. (Fant)

Georgia: Mostly leafspot injury. Only slight injury to fruit reported from southernmost counties. (Dunegan)

Florida: Reported from several widely scattered points in the state. Although the fruit of Muscatine varieties is quite resistant the leaves are quite susceptible. (Dept. Plant Path.)

Louisiana: Some Muscatine grape varieties severely diseased. Others entirely free. (Tims)

Oklahoma: This parasite is unusually destructive this season, especially in the eastern part of the state where as high as 50 per cent. of the crop in some of the unsprayed orchards has been destroyed. (Rolfs)

Ohio: Less severe in the state than last year. In fact very little reported. (Young)

Michigan: Little or no loss in most vineyards. Difficult to find any trace of rot in many plantings. (Bennett)

Manns and Adams (2) found that infection may occur any time after the new shoot is one inch long, although the macroscopic lesions may not appear until the fruit is two-thirds or more grown. No number of sprayings can control blackrot after initial infection has taken place. Dry weather may arrest the disease. Primary infection at the base of new shoots is thought to be the means of carrying over infection for the succeeding year.

GRAPE - Downy mildew

Recent literature on blackrot

1. Guba, E. F. Blackrot and mildew of the vine. Amer. Fruit Grower 45 (5): 12. 1925.

2. Manns, T. F., and J. F. Adams. (Report of) Dept. of Pl. Path. and Soil Bacteriology. In Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

DOWNY MILDEW CAUSED BY PLASMOPARA VITICOLA (BERK. & CURT.) BERL. & DETONI

Downy mildew was of considerably less importance this year than in average years, only Minnesota reporting greater than average prevalence. New Hampshire, New York, Delaware, Virginia, Ohio, and Indiana reported downy mildew to be of slight importance. Losses were estimated as follows: Maryland, 2 per cent; Alabama, 1 per cent; Ohio, .5 per cent; Virginia, Kansas, and Arizona, a trace.

Dates and location of earliest reported appearance of downy mildew, 1925

July 4	Madison	Wisconsin	August 12		Maryland
July 7	St. Paul	Minnesota	August 13	Indianapolis	Indiana
July 20	Stratford	Connecticut	August 15	Dover	New Hampshire
July 20	Green County	New Jersey	August 18	Freehold	Delaware

Massachusetts: Widespread but development checked by dry weather. (Osmun & Davis)

New York: Rare on cultivated grapes. Common on wild grapes. (Chupp)

Maryland: The chief cause of premature defoliation of Niagara grapes in at least one vineyard. It was present on practically all of the vines of this variety and as a result of it, many of the leaves were curling, dying, and falling prematurely. (Haskell)

Illinois: Dry weather throughout most of the season reduced mildew. (Anderson & Tehon)

Recent literature

1. Cadoret, A. La bouillie basique bleue contre le mildiou. Compt. Rend. Acad. Agr. France 11: 686-688. July 1925.

2. Guba, E. F. Blackrot and mildews of the vine. Amer. Fruit Grower 45 (5): 12. 1925.

3. Kotte, W. Observations sur la resistance de certains hybrides au mildiou et au roterbrenner. (Observations on the resistance of certain hybrids to mildew and 'roterbrenner'). Prog. Agr. et Vitic. 83: 13-15. 1925.

4. Manuel, H. L. Downy mildew of the grape. Agr. Gaz. New South Wales. 36: 751-752. Oct. 1925.

5. Ravaz, L. Chronique: Le temps. - Le mildiou. (Current events: The weather. - Mildew.) Prog. Agr. et Vitic. 83: 581-586. 1925.

POWDERY MILDEW CAUSED BY UNCINULA NECATOR (SCHW.) BURR.

The only state, of the ten reporting the disease, in which powdery mildew was said to be important was California, where a loss of 2 per cent was estimated by Milbrath.

Illinois: Very slight infection. General throughout the state late in season. (Anderson & Tehon)

Michigan: A small amount of mildew is present on the leaves in a few vineyards. Generally rare. (Bennett)

Oregon: Not very important. Probably general with host. Controlled with sulfur-dust. (Barss)

California: An important factor. Continuous dusting saved many crops. (Milbrath)

Recent literature

1. Castle, C. B. Combination tractor and sulfur blower. Amer. Fruit Grow. 45 (3): 22. 1925.

2. Guba, E. F.. Blackrot and mildews of the vine. Amer. Fruit Grow. 45 (5): 12. 1925.

3. Fonzes-Diacon. La lutte contre l'oidium. Progr. Agr. et Vitic. 83: 16-18, 40-42. 1925.

4. Vermorel, V. Le permanganate de potasse contre l'oidium. Prog. Agr. & Vitic. 84: 80-83. July 26, 1925.

ANTHRACNOSE CAUSED BY SPHACELOMA AMPELINUM D BY. (GLOEOSPORIUM AMPELOPHAGUM (PASS.) SACC.)

Anthracnose was reported this year from Delaware, Maryland, Florida, Alabama, Mississippi, Kansas, and Porto Rico.

Delaware: Found overwintering on canes. (Adams)

Florida: Of frequent occurrence throughout the grape growing sections. (Rhoads)

GRAPE - Anthracnose; Deadarm; Spring frost injury; Other Diseases

Mississippi: Light infection and slight damage. Less than 1 per cent. (Beal)

Kansas: One report only this year. Of very slight importance. (White)

DEADARM CAUSED BY CRYPTOSPORELLA VITICOLA (REDDICK) SHEAR

Deadarm was reported from New York, Delaware, South Carolina, and Kansas. The first appearance noted in New York was on June 12 in Orleans County. In South Carolina it first appeared on July 21, at Waterloo, and in Kansas on June 30, in Doniphan County.

New York: Present in Chautauqua district most commonly. (Chupp & Pierstorff)

South Carolina: Slight to moderate injury locally. In vineyards in Sand Hill and Piedmont regions. (Fenner)

SPRING FROST INJURY

Frost injury as a factor of grape production was very great in 1925. Some of the collaborators statements follow:

Wisconsin: Temperatures were low enough to kill buds and vines. The vines started growth after being killed back by the frost but only a few blossoms came on second growth. (Vaughan)

Illinois: Frost on May 23 and 24 killed back vines to the old wood in many cases. Also killed all the blossoms. New set of blossoms produced 10 per cent of crop. (Anderson & Tehon)

Virginia: Complete killing on higher altitudes. (Fromme)

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, was reported from Florida (found on Alicante Bouschet at Grand Island; also on an unidentified variety at Dade City. - Rhoads), Michigan, New Mexico, Washington, and Oregon.

Botrytis sp., gray mold rot, was important in some sections of Oregon, causing rot of fruit on the vine and after picking. In the vicinity of Grants Pass the loss on Tokays was about 25 per cent. Rains at picking time favored its development. In California also it was much more prevalent than usual and was serious in many localities, especially in the coastal districts, occurring as a blossom rot in the spring and internal cluster rot in the fall.

GRAPE - Other Diseases; Miscellaneous Literature

Clitocybe monadelpha (Morgan) Sacc., according to Rhoads (10) causes a common and sometimes destructive rootrot in the Ozark section of Missouri, and probably in other southern states.

Exosporium sp., Florida.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) root knot, California (loss 1.5 per cent).

Isariopsis clavispora (Berk. & Curt.) Sacc., leafspot, South Carolina (unimportant); Florida (causes premature defoliation).

Melanconium fuligineum (Soribner & Viala) Cav., bitter rot, Delaware, Florida.

Ozonium omnivorum Shear, rootrot, Texas, Arizona.

Pestalozzia uvicola Speg., leafblight, Delaware, Florida, Ohio (said by Young to be new to state).

Septobasidium sp., Florida.

Chlorosis (non-par.) Common in Texas (due to excess of lime) and New Mexico.

Mosaic, cause unknown, New York, Westchester County. A mosaic-like trouble affected one plant, which showed mottled leaves, dwarfed growth, and set no fruit, while other plants in the same arbor set fruit abundantly. (Barrus)

Recent literature on grape diseases

1. Bioletti, F. T. Black measles. Calif. Grape Grow. 6 (9): 7. Sept. 1, 1925.

2. Castella, F. de. Vine black spot and erinose. Jour. Dept. Agr. Victoria 23: 432-435. July 1925.

3. Faes, H. Les porte-greffes resistant a la chlorose. Progr. Agr. et Vitic. 83: 83-85. Jan. 25, 1925.

4. Heim, R. Les pourridiés (concl.) IV. Le pourridié des vignes déterminé par le Roesleria hypogaea. Traitement Jardinage 12: 328-329. July 1925.

5. Ivanov, B., and P. Patev. Die gefundenden Reben-Krankheiten in Bulgarien. Rev. Inst. Rech. Agron. Bulgarie 3: 2-3, 237-244. 1925. (Germany summary)

6. Pfeiffer, C. Der Grind oder die Mauke, Krebs der Reben. Kranke Pflanze 2: 18-20. 1925.

7. Ravaz, L. Y a-t-il des vignes resistantes au pourridié? Prog. Agric. et Vitic. 42: 173-175. 1925.

8. Ravaz, L. and G. Verge. Sur une maladie de la vigne, l'excoriose. Compt. Rend. Acad. Sci. Paris 180: 313-315. 1925. Phoma flaccida associated.

9. Rhoads, Arthur S. The principles and practices in the prevention of grape diseases. Florida Fruits and Flowers 3: 16, 18-20. 1925.

10. Rhoads, A. S. Rootrot of the grapevine in Missouri caused by Clitocybe tabescens (Scop.) Bres. Jour. Agr. Res. 30: 341-364. 1925.

STRAWBERRY - Leafspot; Leafscorch

STRAWBERRY

LEAFSPOT CAUSED BY MYCOSPHAERELLA FRAGARIAE (TUL.) LIND.

It is noteworthy that leafspot of strawberries seemed to be considerably above the average in prevalence in 1925. New York and Iowa reported the same prevalence as in 1924, but New Hampshire, Virginia, Connecticut, Louisiana, and Kansas reported more. According to the collaborators, the losses caused were as follows: Kansas, 8 per cent; Iowa, 6 per cent; New York, 1.5 per cent; Texas, 1 per cent.

Dates and location of earliest reported appearance of leafspot, 1925

February 15	Denham Springs	Louisiana	June 22	Green County	New York
May 7	Lawrence County	Indiana	July 15	Portsmouth	New Hampshire
May 8	Neosho	Kansas	October 8	Westport	Connecticut

Vermont: Believe that it is above normal in severity. Have had at least one report where it was really destructive. (Lutman)

New York: Very common and frequently destructive. Most injury when spots appeared on fruit pedicels. (Chupp)

Louisiana: Found quite commonly on plants shipped in from Arkansas. It appeared as early as February 15 and continued to the end of the strawberry season about the last of May. (Edgerton & Tims)

Illinois: Very light on account of dry spring. (Anderson)

Kansas: Unusually severe this season. The frost of May 24 reduced the crop about one-half in this state. This was followed by abundant leafspot infection causing 100 per cent death of plants by June 15 in some cases. If severe weather is experienced this winter it is probable that many large commercial patches will be destroyed due to the weakened condition of the plants. (White)

Varietal susceptibility to leafspot of strawberries was reported as follows by White of Kansas:

Severe infection - Burrill, Magic Gem, Kellog Prize, Cooper.
Moderate infection - Gibbon, Eblong, Dunlap.
Slight infection - Howard, Eaton.
Very slight infection - Kellogg Premier.

LEAFSCORCH CAUSED BY DIPLOCARPON EARLIANA (ELL. & EV.) WOLF

This disease was reported from New York, Delaware, Maryland, Indiana, and California. It was said to be more prevalent in Delaware this year.

According to Horne of California, it occurred on wild strawberries transplanted from Lake Tahoe district. The fungus developed in both places but did not spread to other varieties at Berkeley.

According to Birmingham (1) the control of leafscorch consists mainly in the selection of resistant varieties, the destruction of diseased material, and early spraying with bordeaux mixture.

Recent literature

1. Birmingham, W. W. Leafscorch of strawberry. Agr. Gaz. New South Wales 36: 213-214. Mar. 1925.

STEM NEMATODE, TYLENCHUS DIPSACI (KÜHN) BAST.

According to McKay of Oregon, this is the first year that the nematode disease has been found away from the coast on cultivated strawberries except at Corvallis. The grower who reported it said that about 80 per cent of the plants, in a half-acre of old clover land, were badly affected. Young plants from the same source, planted at the same time on land adjoining this patch, but that had been in oats the previous year, had only 3 per cent infection. It is not known definitely whether the clover strain goes to the strawberry or vice versa, but there is some evidence to the effect that it does.

ROOTROTS DUE TO VARIOUS FACTORS

Maine, Massachusetts, Connecticut, New York, Florida, Louisiana, Illinois, Wisconsin, and Colorado reported rootrot.

Florida: Rootrot has been the most troublesome and destructive disease during the past season in strawberry plants in Florida. It has been reported from practically every strawberry growing region and the losses from this disease in many instances have been considerable. In most cases the diseased plants yielded a Fusarium. There may be other associated organisms that may be important. (Rhoads)

Massachusetts: Instances of 10 to 20 per cent loss of plants due to rootrot. (Osmun & Doran)

New York: Important in some soils. Rootrot follows any weakening of the plant. In one field in Nassau County the loss will probably be 90 per cent of the crop. (Chupp)

OTHER DISEASES AND INJURIES

Botrytis rot was reported from Delaware, Virginia, Arkansas, Indiana, Oregon, California, and Connecticut. Barss reported that in Oregon it was very serious this year due to wet weather throughout the spring picking season. A loss of 4 per cent was estimated by Milbrath in California.

Dendrophoma obscurans (Ell. & Ev.) H. W. Anderson, leaf blotch, New York, Indiana, and Florida. According to the annual report of Florida it was found for the first time in that state in two widely separated sections. This is the first report from New York, also (specimen in Pathological Collections).

Phytophthora sp., Arkansas. Rot, apparently caused by Phytophthora is present to a limited extent. Dry weather appears not to have favored rot in the field. (Dept. Plant Path.)

Rhizopus nigricans Ehr., leak, Indiana, Virginia.

Sclerotinia sclerotiorum (Lib.) Mass., Florida (scattered, not important).

Sphaerotheca humuli (DC.) Burr, powdery mildew, New York, Maine.

Chlorosis caused by too much lime was reported from Texas. In Idaho a chlorosis of unknown cause was very important yellowing the leaves, rotting the crowns, and killing the plants. It was very important in southern Idaho on strawberries under irrigation.

Mosaic (undet.) Reported from New York and Canada.

Yellows (undet.) Wisconsin (Aroma badly yellowed. Other varieties adjacent not diseased), Minnesota (moderately abundant on some varieties), Oregon (present in western Oregon and possibly widely distributed).

Recent literature on strawberry diseases

1. Beaumont, A. Strawberry diseases in Devon and Cornwall. Ann. Rept. Dept. Plant Path. Seale-Hayne Agr. Coll. 1 (1923-1924): 12-16. 1925?

2. Chifflot, J. Maladies cryptogamiques attaquant les fraisiers. Rev. Hort. Algerie 29: 113-116. June 1925.

3. Richards, B. L. Plant Pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923-24): 58-61. 1925.

4. Stevens, N. E. Strawberry diseases. U. S. Dept. Agr. Farm. Bull. 1458: 1-10. Aug. 1925.

RASPBERRY

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

This disease, which has been reported chiefly from sections east of the Mississippi River, is one of the most important raspberry diseases of the eastern part of the United States. Of the twenty-one states reporting it in 1925, none reported more than usual, while in Illinois there was said to be much less, and in West Virginia, Kentucky, and Michigan less than usual. However, as will be seen from the loss estimates given in table 72, and from the quotations following, the disease was of very considerable importance.

RASPBERRY - Anthracnose

Table 72. Estimated losses from anthracnose as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
25	Arkansas	3	Minnesota
20	Pennsylvania	2.5	New York
10	Wisconsin, Kansas	1	West Virginia, Illinois,
8	Iowa, Indiana		Michigan, North Dakota
7	Maryland	trace	Virginia

Dates and location of earliest reported appearance of anthracnose, 1925

May 19	Atlantic	New Jersey	July 9	Conway	New Hampshire
June 1		Pennsylvania	July 14	Branford	Connecticut
June 22	Erie	New York			

Massachusetts: Rarely seen in the last two years. (Osmun & Davis)

Connecticut: Serious on black varieties Eldorado and Plum Farmer. (Clinton)

New York (Erie County): Considerable anthracnose on purples and blacks was found. Some fields have as high as 95 per cent infection. (Taylor)

Pennsylvania: Bad all over state. Lesions on canes, petioles, leaves, and fruit. We have demonstrated conclusively that it can be controlled by thorough spraying. (Krout)

Arkansas: Very important all over state. Very little attempt at control. (Dept. Plant Path.)

Indiana: Limiting factor in commercial plantings. Delayed dormant spray of lime-sulfur 1-10 controls. Dietz reports disease is being controlled in nurseries by the spray. (Gardner)

Illinois: Very slight since light infection on canes did not reduce vitality. General, but worse in northern section of the state. Very dry in spring. On black raspberries. (Anderson & Tehon)

Wisconsin: Major disease, especially in blackcaps. More on red raspberry than ever before. Rapid spread to blackcaps early in the spring. Killing canes. (Vaughan)

Minnesota: Important with some varieties. Of the red varieties, Sunbeam and Ohta apparently very susceptible. A two-acre planting of Sunbeam ruined by anthracnose. (Div. Plant Path.)

Kansas: Twenty to fifty per cent cane infection; up to 100 per cent leaf infection. (White)

RASPBERRY - Anthracnose; Crowngall

Oregon: Not a limiting factor on cane fruits in Oregon. Climatic conditions apparently unfavorable. Occurs on blackcaps to a very limited extent. (Zeller)

According to Baker (1), in the past ten years some states have reported a decrease in acreage as great as 80 per cent, due to anthracnose, while others report annual losses of 25 to 50 per cent of the crop. The only sure way to control disease is by careful and thorough spraying.

Burkholder (2) reports the delayed dormant spray alone if thoroughly applied, will hold the disease in check, provided that spraying is started not later than the spring of the second growing season.

Wilcox (3) discusses the risk of injuring the plants in following the spray methods ordinarily recommended at present.

Recent literature

1. Baker, C. E. Raspberry anthracnose and its control. Better Crops 4: 10-11, 43. Mar. 1925.

2. Burkholder, C. L. Raspberry anthracnose preventives. American Fruit Grower 45 (4): 16. 1925.

3. Wilcox, R. B. The spraying of black raspberries. American Fruit Grower 45 (2): 4, 20, 23. 1925.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

Crowngall was reported to be of slight importance in West Virginia, Massachusetts, and New Mexico, but of considerable importance in Michigan, Minnesota, Iowa, and Washington. Six states reported loss estimates as follows: Michigan, 10 per cent; Iowa, 6 per cent; Pennsylvania and Kansas, 3 per cent; Minnesota and New Mexico, 2 per cent.

New York: Crowngall found mostly on La France variety in Westchester County. (Chupp & Pierstorff)

Pennsylvania: We are eliminating this disease from new patches by using plants from our rogued plantations. It is decreasing in Pennsylvania. (Krout)

Ohio: At present crowngall is not a serious problem of raspberry growers in Ohio. Raspberry plants grown in Ohio seem to be generally free from galls. Where fields are found heavily infested the plants have as a rule been purchased in other states. (Rept. Plant Pathologists, Northern Ohio Exp. Sta.)

Indiana: Mostly on red raspberry. Found also on purple and black raspberry this season. (Gardner)

Michigan: Statewide, but most severe in Berrien County. (Bennett)

RASPBERRY - Crowngall; Leafcurl; Mosaic

Wisconsin: Major disease in many orchard nurseries. (Vaughan)

Minnesota: About 75 per cent in new planting on soil previously planted to badly galled rose bushes. Plants from same stock but on other soil have only a trace of gall. (Div. Plant Path.)

Washington: The crowngall situation is important. Badly infected seedlings have apparently recovered. (Frank)

LEAFCURL (UNDET.)

Leafcurl of raspberries was reported to be serious in Indiana on blackcaps, but of slight importance in Ohio and New Mexico. The losses reported were: Pennsylvania, 5 per cent; Maryland and Michigan, 3 per cent; North Dakota, 2 per cent; Iowa, trace.

Dates and location of earliest reported appearance of leafcurl, 1925

June 1	New Castle	Pennsylvania	June 24		Indiana
June 15	Warrens	Wisconsin	July 14	Meriden	Connecticut

New York: Almost all of the berries in the Brandt section of Erie County are affected with leafcurl. (Taylor)

Pennsylvania: Occurs in Pennsylvania only on the reds and purples. It is not of common occurrence. (Krout)

Michigan: Cumberland and Cuthbert only commercial varieties affected. (Bennett)

Wisconsin: Practically wiped out on nursery planting stock. (Vaughan)

Minnesota: Minnesota No. 2 apparently quite subject, 20 per cent in one planting. Marlborough and Cuthbert susceptible. (Sect. Plant Path.)

The relation of insects to the transmission of raspberry leafcurl is discussed by Smith (1). His conclusions are:

"1. Aphis rubiphila, Patch, was the only insect carrier of raspberry leafcurl among several insects used. 2. The aphids must feed upon a diseased plant before becoming a carrier. 3. The infective agent is not carried over winter within the egg from the fall generation to the spring forms. 4. The infective agent is not inherited by the offspring in viviparous reproduction. 5. Leafcurl was transmitted from black to red raspberries but not from red to black varieties."

MOSAIC (UNDET.)

The losses reported as due to mosaic of raspberry were comparatively high. Pennsylvania estimated 60 per cent; New York and Minnesota, 15 per cent; Michigan,

12 per cent; Iowa, 8 per cent; Maryland, 2 per cent; and California, .5 per cent. In New York, according to Chupp, "Mosaic is the most serious disease of redcaps." The disease was reported to be on the increase in Massachusetts and very important in Michigan.

Dates and location of earliest reported appearance of mosaic, 1925

May 19	Atlantic	New Jersey	July 2	Orange	Connecticut
June 1	Greene County	New York	July 12	Durham	New Hampshire
June 1		Pennsylvania			

Connecticut: Found on June, Cuthbert (bad), Perfection, St. Regis, Latham, Columbian, and Winfield. (Clinton & Hunt)

Pennsylvania: Columbian probably somewhat resistant. Roguing, which has been practiced in Pennsylvania for three years, has given very good results. We have for distribution this year 200,000 disease-free plants. (Krout)

New Jersey: Symptoms masked by high temperatures in early summer. (Martin)

Ohio: One of the limiting factors of growing raspberries in this state. (Young)

Wisconsin: Major trouble with red raspberries. Fifty-four nurseries could not be issued general certificates because of infection in Latham and King. (Vaughan)

Minnesota: Latham generally affected. Only thirty-two certified plantings in the state. By roguing, selection, and isolation, the amount of clean propagative stock has increased. Sunbeam and St. Regis apparently resistant, but they are of minor commercial importance. (Sect. Plant Path.)

According to Stakman (2), mosaic is very common on wild raspberries in northern Minnesota and Canada. The varieties Marlboro, Cuthbert, Redpath, and King are quite susceptible, while Latham is generally infected but yields well in spite of the disease. Herbert, Sunbeam, St. Regis, Columbian, Donoborough, Ranere and several others seem to be fairly resistant, especially if not grown near susceptible varieties.

Wilcox (3) reported that:

> "Certain types of raspberry mosaic are masked during hot weather. Mottled leaves formed during cool weather retain their mottling, but new leaves developed during hot weather appear normal.....
>
> "Rubus innominatus, infected with one type of transmissible mosaic, was found to be not only peculiarly sensitive to temperature changes, but recorded these changes by very conspicuous leaf markings. Such infected canes, accompanied by a record of their growth during the summer, showed correlation between the appearance of seemingly healthy leaves and the occurrence of periods of high maximum temperatures. Study of this relationship indicates that for the mosaic of Rubus innominatus the critical temperature is approximately 75°F. (24°C.)"

RASPBERRY - Streak; Leafspot; Spurblight

STREAK (UNDET.)

Raspberry streak was reported from Connecticut and Oregon. From the latter state Zeller reports, "The disease is confined to two plantings of the blackcap variety Cumberland at Gresham; and causes very slight injury; although the percentage of infection is very high. Streaking on the canes is masked at low temperatures. Leaf mottling appears during cool weather of spring."

Recent literature

1. Smith, Floyd T. The relation of insects to the transmission of raspberry leafcurl. Jour. Econ. Entom. 18: 509-513. June 1925.

2. Stakman, E. C. Raspberry mosaic. Minnesota Horticulturist 53: 85-87. 1925.

3. Wilcox, R. B. Observations on masking of raspberry mosaic by high temperature. (Abstract) Phytopath. 16: 80. Jan. 1926.

LEAFSPOT CAUSED BY MYCOSPHAERELLA RUBI ROARK (SEPTORIA RUBI WEST.)

Leafspot of raspberry was reported from Maine, New York, New Jersey, Illinois, Iowa, Kansas, and California. In California it caused a loss estimated at 8 per cent, while in Iowa, the loss reported was 3 per cent.

Illinois: An unusually early outbreak of leafspot was noted at Quincy, Illinois, on May 5. The spots were well formed and a few pycnidia could be found at that time. (H. W. Anderson)

Kansas: Important this year. Lesions on canes and buds killed on severely infected canes. The disease caused early defoliation. (White)

California: Very serious in the state this year. (Milbrath)

Porto Rico: Apparently was brought in on plants from Florida. (Cook)

SPURBLIGHT CAUSED BY MYCOSPHAERELLA RUBINA (PK.) JACZ.

Spurblight was reported from New York, Wisconsin, Minnesota, North Dakota, and Oregon. In Wisconsin, Minnesota, and North Dakota it was one of the most important raspberry diseases.

New York: Fairly common but seldom serious. (Chupp & Pierstorff)

Wisconsin: Very general. One of the major troubles of red raspberries. (Vaughan)

Minnesota: In some plantings it was apparently correlated with winter injury. Estimated loss 2 per cent. Ohta generally free. King and Latham usually infected, probably less in Latham than in King plantings. (Sect. Plant Path.)

Oregon: Very bad in the Ashland district; some damage following winter injury in the Willamette Valley. It occurs throughout western Oregon, but the only district where it is really serious is the Ashland district of southern Oregon. There is some indication that drouth or other unfavorable weather conditions during the year the canes make their growth favor the development of this fungus the succeeding year. It occurred especially on red raspberry, but often on winter-injured blackcaps. Spraying with Bordeaux 3-3-30 when canes are from 4 to 8 inches high, 15 to 18 inches inches, and 36 inches, has given rather satisfactory results, although the first two applications are all that are really necessary. Cuthbert is the only variety grown commercially. (Zeller)

SPRING FROST INJURY

The losses reported as a result of frost injury this year were as follows: Minnesota, 30 per cent; Michigan, 10 per cent; Iowa, 6 per cent; Maryland, 5 per cent.

Wisconsin: Frost injury found even on the so-called winter-proof Latham. (Vaughan)

Minnesota: Latham, which is ordinarily winter-hardy, badly affected, especially on low rich soil. Sunbeam and Ohta apparently are winter-hardy. (Div. Plant Path.)

South Dakota: Although there was much damage to other fruits the raspberry escaped. (Evans)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl.) Quel., rootrot, Washington. (Frank)

Ascospora ruborum (Oud.) Zeller (5), leafspot, reported from Washington and Oregon. Zeller stated that, "This is the commonest fungus in western Oregon but it is questionable how much damage it does. It prevents winter-injured plants from recovering when they might otherwise produce a good crop."

Botrytis sp., gray mold rot, Connecticut (one report), New York (seen occasionally), and Washington. In Washington it was probably the cause of blight of the newly formed fruit according to Arthur Frank.

Cercospora sp., leafspot, Florida.

Gymnoconia interstitialis (Schl.) Lagh., orange rust, Michigan and Wisconsin. See blackberry.

RASPBERRY - Other Diseases
BLACKBERRY - Orange rust

Phragmidium imitans Arth., leaf rust, Washington, Oregon. According to Zeller of Oregon, "This rust is very prevalent this year causing the usual leaf lesion but the serious phase of the disease is the cane lesion produced at the base causing a brittleness." In Washington it is prevalent in the Puget Sound region.

Phyllosticta sp., leafspot, Florida.

Sphaerotheca humuli (DC.) Burr., A powdery mildew, probably this species, was reported from Oregon. According to Zeller it is limited to the Munger variety, on which it is very serious, affecting canes as well as leaves. An undetermined powdery mildew occurred on red varieties in Indiana.

Verticillium albo-atrum Reinke & Berth., bluestem, wilt (4, 6, 7). Very destructive on black raspberries in New York, according to Chupp and Pierstorff. Also reported from Ohio and Washington.

Bacterial blight (undet.) reported from Washington causing a twig blight on the variety Antwerp. (Frank)

Recent literature on raspberry diseases

1. Atwood, G. G. Raspberry diseases and control measures. Circ. Dept. Farms & Markets, New York 280: 11 p. 1925.

2. Colby, A. S. The raspberry disease situation in Illinois. News Letter Illinois State Hort. Soc. 1925 (4). May 10, 1925.

3. Frank, A. 1924 information on winter injury, mosaic and other diseases of raspberries in western Washington. Proc. Washington State Hort. Assoc. 2: 128-135. 1925.

4. Harris, R. V. The blue stripe wilt of the raspberry. Jour. Pomol. & Hort. Sci. 4: 221-229. June 1925.

5. Zeller, S. M. Coryneum ruborum Oud. and its ascogenous stage. Mycologia 17: 33-41. Jan.-Feb. 1925.

6. _____ A case of Verticillium wilt (blue stem) (V. alboatrum) of black raspberry in Oregon. (Abstract) Phytopath. 15: 125-126. 1925.

7. Zundel, G. L. Why raspberries "run out". West. Fruit 7 (4): 7. Apr. 1925.

BLACKBERRY

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH. AND KUNKELIA NITENS (SCHW.) ARTH.

Of the 17 states reporting on orange rust of blackberry not one indicated greater prevalence of this disease than last year or in normal years. Arkansas reported it to be very important and in Wisconsin it was the major disease.

BLACKBERRY - Orange rust; Anthracnose; Other Diseases

Table 73. Estimated losses from orange rust as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	Arkansas, Iowa	.5	Pennsylvania
2	Michigan	trace	New York
1	West Virginia, Maryland		

Dates and location of earliest reported appearance of orange rust, 1925

April 11	Calhoun	South Carolina	June 8	Greene County	New Jersey
April 12	Raleigh	North Carolina	June 21	Plymouth	Connecticut
April 15	Middlesex	Pennsylvania	July 6	Hillsboro	New Hampshire
May 7	Orange County	Indiana			

Pennsylvania: This disease is not very common on the blackberry where the patch is well cared for. (Krout)

Florida: Very severe on blackberries in this state. (Dept. Plant Path.)

Michigan: More destructive on black raspberry than on blackberry. (Bennett)

Wisconsin: Major importance this year. Noted considerable on red raspberries in La Crosse and Washakie Counties. Came late, after September 1. (Vaughan)

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Anthracnose of blackberry was of slight importance in 1925 according to the reports submitted. Arkansas and Iowa reported losses of 1 per cent.

Pennsylvania: Only a trace (less than one-eigth of 1 per cent) of this disease can be found on plantations well cared for. (Krout)

Florida: Well distributed over the state and is doing considerable damage. (Dept. Plant Path.)

Oklahoma: Causing considerable loss especially in plantations where the plants were weakened by adverse weather and soil conditions. (Rolfs)

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, New York (on wild blackberry), Florida, Washington.

BLACKBERRY & Other Diseases
DEWBERRY - Diseases

Botrytis fruit rot, Massachusetts. "Rotting of ripened berries common with considerable damage. A Botrytis is most frequently isolated but Rhizopus and Penicillium also present." (Davis)

Cephaleuros virescens Kze., algal leafspot, Florida.

Cercospora rubi Sacc., blotch, Florida, Louisiana (common).

Fusisporium rubi Wint., double blossom, Delaware, Florida. According to Adams of Delaware, this is the first infection observed in a commercial planting in Delaware. In Florida it was reported several times from various sections of the state doing considerable damage.

Mycosphaerella rubi Roark, leafspot, reported from New Jersey (not important), Florida (occasional), Louisiana (common), Texas (prevalent), Indiana (same), and Iowa (unimportant).

Canker (undet.) An undetermined canker associated with Coryneum and Phomopsis was observed in Washington.

Dwarf disease (virus), reported from Oregon by Zeller (1), "Causes dwarfing of canes and stubbiness of ends of canes similar to streak, but no streaking of canes. As far as known, this disease occurs only on the Pacific coast. The most susceptible host is Phenomenal blackberry, which should not be planted. Have never seen a planting of this variety, or one containing this variety, that did not have some dwarf. Transmitted to loganberries wherever they are planted with Phenomenal."

Frost injury, Michigan reported 3 per cent loss. In Wisconsin frost injury was a major trouble while in Illinois, according to Anderson, blackberries were damaged more seriously by the frost of May 23, than were raspberries.

Mosaic (undet.) A mottled appearance of leaves observed at Middlesex, New Jersey, August 16.

Recent literature on blackberry diseases

1. Zeller, S. M. Some facts about loganberry "dwarf". (Abstract) Phytopath. 15: 125. Feb. 1925.

DEWBERRY

Anthracnose caused by Plectodiscella veneta (Speg.) Burk. was reported from New York and South Carolina. According to Fenner of South Carolina, "Anthracnose was important but not serious. It occurred in local areas of the Sand Hill and Coastal Plain regions, wherever the crop was grown. New growth became infected from old canes which remained uncut. Bordeaux sprays have controlled the disease."

Dutton (1) recommends, as a result of three years' experiments on the control of dewberry anthracnose, a delayed dormant application of lime-sulfur 5-100 with the addition of one pound of calcium caseinate, to be followed about a week before blooming by an application of Bordeaux mixture 4-8-100.

Leafspot caused by Mycosphaerella rubi Roark, Delaware (generally prevalent in commercial plantings).

Orange rust caused by Gymnoconia interstitialis (Schl.) Lagh., reported from Dutchess County, New York.

LOGANBERRY TO CURRANT

Recent literature on dewberry diseases

1. Dutton, W. C. Spraying dewberries for anthracnose. Mich. Sta. Spec. Bul. 144: 3-13. 1925.

2. Matthews, C. D. Dewberry growing. Amer. Fruit Grow. Mag. 45 (6): 5, 14-15. June 1925.
Two most serious troubles are anthracnose and double blossom.

LOGANBERRY

Anthracnose caused by Plectodiscella veneta (Speg.) Burk. was reported from Washington.

Crowngall caused by Bacterium tumefaciens EFS. & Town. was reported from Washington.

Dwarf (virus) (1) was reported by Zeller from western Oregon, "Keeping out Phenomenal blackberry, which is always affected, and roguing give effective control. Quite common but can probably be controlled."

Leafspot caused by Mycosphaerella rubi Roark. According to Zeller, this leafspot is very common in Oregon, but is easily controlled by Bordeaux sprays.

Mosaic (undet.) was reported from Washington.

Spur blight caused by Mycosphaerella rubina (Pk.) Jacq., leafspot, Oregon (limited to winter injured plants causing what the growers call gray bark).

Winter injury. Regarding winter injury in Oregon S. M. Zeller of Oregon wrote:

> "In the Willamette Valley about 60 per cent of the canes were killed outright and the 40 per cent remaining had a very favorable spring with cool weather and intermittent rainfall until the second or third week in June. However, this favorable weather was conducive to the production of large leaf surface and a large set of fruit on fruiting canes and an abundance of new cane growth, thus with the hot weather late in June, approximately a 40 per cent loss in the berries set was brought about two conditions: (1) The partially winter injured canes could not supply sufficient moisture to the developing fruits which died before maturity. (2) Ripe and partially ripe berries were sunburned."

Recent literature

1. Zeller, S. M. Some facts about loganberry "dwarf". (Abstract) Phytopath. 15: 125. 1925.

CURRANT

Leafspot caused by Mycosphaerella grossulariae (Fr.) Lind., New York (statewide, less than usual).

Anthracnose caused by Pseudopeziza ribis Kleb., New Jersey (unimportant), Oregon (general with host).

CURRANT TO CRANBERRY

Rust caused by Puccinia grossulariae (Schum.) Lagh., Winnepeg, Canada.

Blister rust caused by Cronartium ribicola Fisch., (See white pine, Supplement 48).

Powdery mildew caused by Sphaerotheca mors-uvae (Schw.) Burk. & Curt., Washington and Manitoba, Canada (rather injurious this year).

Scald (high temperature), New York.

Reversion disease (undet.) An interesting article by A. H. Lees on means of infection with the reversion disease of black currants appeared (2).

Recent literature

1. Anon. Reversion disease of black currants. Big bud. Fruit, Flower and Veg. Trades Journ. 47: 670-671. June 1925.

2. Lees, A. H. Reversion disease of black currants: Means of infection. Ann. Appl. Biol. 12: 199-210. May 1925.

GOOSEBERRY

Anthracnose caused by Psuedopeziza ribis Kleb., was reported from New Jersey, Indiana, and Oregon. In the Willamette Valley of Oregon, according to Barss, much more than normal was reported and a loss of 10 per cent was estimated. Serious defoliation occurred in many cases, with resulting damage to the vitality of the bushes which will probably affect next year's crop.

Powdery mildew caused by Sphaerotheca mors-uvae (Schw.) Berk. & Curt., Wisconsin, Washington, Oregon.

Rust caused by Puccinia grossulariae (Schum.) Lagh. was reported to have caused a 2 per cent loss in Iowa.

Die-back, Botrytis sp., Washington.

Recent literature

1. Colby, A. S. Control of the leafspots on gooseberries. Amer. Fruit Grow. Mag. 45 (7): 24. 1925.

2. Dietrich, O. Bekämpfung des amerikanischen Stachelbeermehltaues. (Control of American gooseberry mildew). Deut. Obst- u. Gemuseb.-Zeit. 71: 80-81. Feb. 13, 1925.

3. Hahn. Die Winterbehandlung des Stachelbeermehltaues. (The dormant treatment of gooseberry mildew). Gartenw. 29: 188-190. 1925.

CRANBERRY

Blight, more of this trouble occurred in Wisconsin this year than usual, according to S. B. Fracker. He reported that seventy-five per cent of fruit stopped development at pin-head size.

False blossom. According to Stevens (4) observations on false blossom of cranberry seem to indicate that this trouble is infectious. It is thought that false blossom was not due entirely to poor cultural conditions because it often occurs in well-drained and well-cultivated bogs. The author suggests that until the cause of the disease has been definitely determined it is unwise to plant vines from bogs where the disease occurs. According to S. B. Fracker, this disease seems to be increasing slowly in Wisconsin where it was slightly more prevalent than usual. Aside from the frost this is considered a major trouble in cranberry production in that state. Apparently a temporary improvement is induced by holding winter flood until July 1. It was found on 48 of 61 marshes examined, and for the first time in history in three wild bogs.

Cranberry Diseases in Washington and Oregon

The following report was submitted on cranberry diseases in Washington and Oregon in 1925 by H. F. Bain, of the Office of Fruit Disease Investigations, United States Department of Agriculture:

> "The 1925 cranberry crop in the Pacific Coast region was the largest on record, chiefly due to the uniformly good yield on most of the Washington bogs. As in past years, very little field loss was caused by fungi. Hard-rot or cotton-ball, caused by Sclerotinia oxycocci Wor., was present in a few bogs, but on the whole this disease was less abundant than usual. Such vine diseases as rose-bloom (Exobasidium oxycocci Rost.), red leaf-spot (E. vaccinii (Fckl.) Wor.) and black stem spot (caused by an undescribed fungus) were also less abundant than in an average year.
>
> "The berries kept well in storage, in contrast to the experiences of some years. The usual species of fungi were found in culture made from berries which rotted in storage. In a series of 750 such cultures, the end-rot organism (Fusicoccum putrefaciens Shear) developed in 63 per cent, Penicillium sp. in 13 per cent, and Phomopsis sp. in 4 per cent of the cultures. Other fungi which occurred less frequently were Botrytis sp., Coniothospora lunata Shear, Sporonema oxycocci Shear, and Sporonema pulvinatum Shear."

Disease Control by Airplane Dusting

An interesting possibility in the control of cranberry diseases by dusting from airplanes has been reported (U. S. Dept. Agr. Official Record 4 (51): 6. Dec. 23, 1925).

> "The airplane dusting of cranberry bogs undertaken at Pemberton, New Jersey, during the annual meeting of the American Cranberry Growers' Association, August 26, 1925, was little more than a demonstration of the practicability of so handling an airplane as to give satisfactory distribution of the dust on cranberries.
>
> "That copper lime dust will greatly reduce the fruit rots of cranberries has been proven by three years' work with hand dusting machines in Massachusetts. The airplane apparatus at Pemberton indicated that a fairly satisfactory application of dust may be obtained by airplane.
>
> "If practicable, airplane dusting offers certain advantages in addition to the speed of the operation over any other known means of applying fungicides to cranberry bogs. In cultivated bogs the cranberry vines

cover the ground completely like the grass in a well-kept yard. Ordinary spraying or dusting operations necessitate a certain amount of trampling which is generally believed to be injurious.

"One difficulty encountered in arranging for the demonstration at Pemberton was to find a bog having a satisfactory landing place near by. Few cranberry bogs are located near large open fields. Most large bogs have, however, good-sized reservoirs or ponds near by, and it has been suggested that a hydroplane should be used for dusting cranberry bogs."

Recent literature on cranberry diseases

1. Anon. Aeroplane wins friends among cranberry growers. New Jersey Agriculture 7 (10): 13, 15. Oct. 1925.

2. Beckwith, C. S. Cranberry disease work in New Jersey. Proc. Amer. Cranberry Grow. Assoc. 55: 11. 1925.

3. Morse, S. F. Airplane dusting for cranberry pest control. Proc. Amer. Cranberry Grow. Assoc. 56: 4-5, 8. 1925.

4. Stevens, Neil E. Field observations on false blossom of the cultivated cranberry. Phytopath. 15: 85-91. 1925.

5. _____ Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Growers Assoc. 55: 7, 10. 1925.

BLUEBERRY

Leafspot caused by Phyllosticta sp., reported from Palm Beach County, Florida, July 7.

Stem rust caused by Calyptospora columnaris (Alb. & Schw.) Kuehn was reported from Minnesota where it is said to be fairly common in the northeastern part of the state.

Recent literature

1. Stevens, Neil E. Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Growers Assoc. 55: 7, 10. 1925.

MULBERRY

Texas rootrot caused by Ozonium omnivorum Shear was reported as prevalent on mulberries growing in the black lands of Texas.

Popcorn disease caused by Sclerotinia carunculoides Siegler & Jenkins was reported with specimens from Telfair County, Georgia, by O. C. Boyd and from Alabama by W. L. Blain.

CITRUS FRUITS - Citrus canker; Citrus blast; Melanose

DISEASES OF SUB-TROPICAL FRUITS

Prepared by H. R. Fulton

CITRUS FRUITS

Diseases Caused by or Attributed to Parasites

CITRUS CANKER CAUSED BY BACTERIUM CITRI (HASSE) JEHLE

Citrus canker was reported to be common on oranges in the Bayou Lafourche district of Louisiana (Edgerton). In Florida five infected trees were discovered March, 1925, at Boynton. They were all destroyed. No canker was observed in Alabama or Texas, according to collaborators.

CITRUS BLAST CAUSED BY BACTERIUM CITRAREFACIENS LEE (PSEUDOMONAS CITRIPUTEALE)

California: Prevalence about the same as usual; causes death of leaves, of areas surrounding leaf scars, and of some twigs; occurs in northern California; usually worst in March and April; sweet orange susceptible, lemon a little less so. (Fawcett)

MELANOSE CAUSED BY PHOMOPSIS CITRI FAWCETT

Melanose was reported to be present but unimportant in Alabama and Louisiana. The following reports were received from Florida and Arizona.

Florida: Severe this season as a result of considerable rain occurring before the fruit reached the immune state. Excellent control was secured with Bordeaux-oil emulsion. (Rhoads)

Less severe than usual. About 75 per cent of the citrus plantings more or less severely infested. One application of Bordeaux-oil emulsion made in late April or early May gives good control. (Winston)

+ Arizona: On leaves of sweet seedling orange, Pima County. Probably first report from state. (Streets)

Note + See ERRATA P. 502

CITRUS FRUITS - Stem end; Scab; Blue mold rot

CITRUS STEM END ROT CAUSED BY PHOMOPSIS CITRI FAWCETT AND DIPLODIA NATALENSIS EV. AND OTHER FUNGI

In Alabama and Louisiana stem end rot was said to be of slight importance. Other reports received are as follows:

Florida: About as prevalent as usual. (Rhoads)
More than usual. More prevalent in groves during the fall than has been the case since 1918. (Winston)

California: Stem end rot caused by Diplodia sp. and by Dothiorella ribis was of minor importance in long storage of fruit from coastal sections. Phomopsis californica was less prevalent than last year, and was probably of minor importance, except on storage lemons. (Fawcett)

Porto Rico: Common, causing losses in shipment. (Cook & Tucker)

CITRUS SCAB CAUSED BY SPHACELOMA SP. (S. FAWCETTI JENKINS; SPOROTRICHUM CITRI BUTLER)

Florida: More severe than usual in some sections when weather conditions favored development. (Rhoads)
About the same as usual, of major importance in low damp situations. About 75 per cent of grapefruit plantings more or less infested. A late dormant application of Bordeaux-oil emulsion gives better control than any other time. (Winston)

Alabama: Same as usual; controlled by spraying. (Miles & Blain)
Serious on satsuma oranges where not controlled by Bordeaux mixture applied to the very young fruit, beginning with petal drop. (Fulton)

Louisiana: Common in satsuma oranges, as usual. (Edgerton)

Texas: Unimportant, traces. (Taubenhaus)

Porto Rico: Abundant, the most important citrus disease on the island; good results from use of Bordeaux mixture. (Cook & Tucker)

BLUE MOLD AND GREEN MOLD ROTS CAUSED BY PENICILLIUM ITALICUM WEHMER AND P. DIGITATUM (FR.) SACC.

Penicillium rot was reported by Fulton to be of very slight importance in Alabama, while Cook and Tucker said that it was common in Porto Rico. Reports from Florida and California are as follows:

CITRUS FRUITS - Blue mold rot; Anthracnose; Footrot

Florida: This form of decay is far more prevalent than in recent years, especially during the fall and early winter; excessive rains aggravated the trouble, but it also seems that the fruit was unusually tender; borax has not given as much control as was expected. (Winston)

California: Both types of rot common everywhere; borax wash has effectively controlled the common green mold (P. digitatum) but has not been entirely successful against the blue contact mold (P. italicum). (Fawcett)

ANTHRACNOSE AND CITRUS WITHERTIP ATTRIBUTED TO COLLETOTRICHUM GLOEOSPORIOIDES PENZ.

Anthracnose was reported to be of minor importance. Besides the statements quoted below, reports were received from Louisiana, Texas, and Porto Rico, where it is sometimes severe, according to Cook and Tucker.

Florida: Usual occurrence; of minor importance; probably not a real disease, but a manifestation following root drowning, starvation, frost injury, drouth, etc. (Winston)

Common and widespread throughout the citrus section of the state but no more severe than usual and cannot be considered major diseases. Withertip is inclined to develop most abundantly on trees whose vitality has been greatly reduced for any reason, especially from drought. Anthracnose caused some damage to fruit locally. (Rhoads)

Alabama: Not important. (Mi[illegible]lain)

Occurs as slow frui[illegible] of satsuma oranges in long storage. (Fulton)

California: Usually a minor t[illegible]e characterized by spotting or slow rotting of fruits. (Fawc[illegible])

FOOTROT ATTRIBUTED TO PHYPHTHORA TERRESTRIS SHERB.

Florida: Usual prevalence; banking with clay to induce root formation above girdled base seems to have given good results in one instance. (Rhoads)

Of major importance on seedling orange and grapefruit trees; sweet orange, rough lemon, grapefruit and sour orange stocks are increasingly resistant in the order given; aeration of the crown gives good results, especially when roots are painted with a bluestone paste. (Winston)

Texas: Same as usual; only a few trees affected and progress of the disease is slow; cleaning and painting with Bordeaux successful. (Alsmeyer)

FRUIT ROTS CAUSED BY VARIOUS ORGANISMS

Black rot caused by Alternaria citri Pierce, Florida, "Of occasional occurrence usually as blossom end rot." (Fulton); Alabama, "On satsuma oranges in long storage." (Fulton); California, "Hard, firm decay at stylar end of oranges, especially Washington Navels, was more prevalent than usual, and fairly important although only a small percent of all oranges involved; Alternaria rot of lemons was about the same as usual, and was important in stock held in long storage." (Fawcett)

Brown rot caused by Pythiacystis citrophthora E. H. & R. E. Sm., Californ "Occurrence was less than usual, associated with less than normal moisture durin season of greatest prevalence, from November to February; lemons are most susceptible, followed by oranges; controlled by spraying the ground and lower branches with 3-3-50 Bordeaux mixture." (Fawcett)

Grey mold rot caused by Botrytis cinerea Pers., California, "Occurred principally on lemon fruit, and was less prevalent than usual. (Fawcett)

Sclerotinia rot caused by Sclerotinia sclerotiorum (Lib.) Mass., California, "Less prevalent than usual, attributable to less than normal moisture; attacks lemons principally in storage." (Fawcett)

Fusarium rot caused by Fusarium spp., Florida, "Of minor importance usually as a form of blossom-end rot of oranges." (Fulton); Alabama, "Of minor importance as a cause of decay in long storage." (Fulton); California, "A minor decay of citrus fruits, firm to soft and pliable." (Fawcett)

Oospora rot caused by Oospora citri-aurantii C. O. Sm., Alabama, "Less than usual; follows insect puncturing of mature fruit in wet weather." (Fulton). California, "A sour, watery storage rot of lemons, of minor importance because of less long storage." (Fawcett)

Aspergillus rot caused by Aspergillus niger Tiegh. was reported from Florida and California; of minor importance, favored by high temperature.

Trichoderma rot caused by Trichoderma lignorum (Tode) Harz, California, "A minor decay of citrus fruits, leathery and chocolate brown." (Fawcett)

GUMMOSIS DUE TO VARIOUS ORGANISMS

Pythiacystis gummosis caused by Pythiacystis citrophthora E. H. & R. E. Sm., California, "Less than usual, moisture being less than normal; causes death of bark on trunk and roots and is coextensive with citrus plantings; greatest injury in spring and summer; lemon, sweet orange and grapefruit stocks susceptible; trifoliate and sour orange stocks resistant." (Fawcett)

Botrytis gummosis caused by Botrytis cinerea Pers., California, "Was of minor importance being less than normal, the season being relatively dry; prevalemt in the moister coastal regions; causes death of bark on trunk of lemons." (Fawcett)

Diplodia gummosis caused by Diplodia sp., California, "Occurs mostly on lemon in moister coastal sections causing death of local areas of bark and wood." (Fawcett)

Dothiorella gummosis caused by Dothiorella ribis (Fckl.) Sacc., California, "A newly recognized disease causing death of areas of bark with formation of gum pockets on lemon trunks in moister coastal sections; lemons are most susceptible." (Fawcett)

CITRUS FRUITS - Gummosis; Wood rots; Parasitic diseases; Non-Parasitic diseases

Decorticosis (shell bark) caused by Phomopsis californica Fawc., California, "Less than usual; affects outer bark of trunk of lemon trees from 12 to 25 years of age; more usual in coastal region or moister foothills, less in interior drier sections." (Fawcett)

WOOD ROTS CAUSED BY TRAMETES HYDNOIDES, POLYPORUS GILVUS (SCHW.) FR., GANODERMA LUCIDUM (FR.) KARST.

Florida: Found more or less frequently on dead citrus trees, or growing from dead wood of footrot lesions at the bases of living seedling trees, undoubtedly hastening the decay and breaking off of the tree. Other fungi observed on dead citrus wood are Fomes fasciatus (Lev.) Fr., Schizophyllum commune Fr. and Daldinia concentrica (Bolt.) Ces. & DeNot. (Rhoads)

OTHER PARASITIC DISEASES

Rootrot, Armillaria mellea (Vahl) Quel., California, "Apparently increasing in importance. Distribution spotted, most prevalent where oaks have preceded citrus, or along river washes." (Fawcett)

Sooty mold, Capnodium citricolum McAlp., Florida (about same as usual; controlled by suppression of white fly and scale insects - Fulton), Texas, Porto Rico.

Algal leafspot, Cephaleuros virescens Kunze, was reported by Cook as occurring commonly in neglected orchards in Porto Rico.

Scaly bark and naihead rust attributed to Cladosporium herbarum citricolum Fawc., Florida, "Limited to a few localities and most prevalent in old seedling orange groves that have been badly neglected; it frequently disappears from a planting without any special steps being taken to combat it." (Rhoads)

Felty fungus girdle, Septobasidium pedicellatum (Schw.) Pat., occurred on orange and tangerine in Florida. (Rhoads)

Lime withertip, Glocosporium limetticolum Clausen, Florida (of major importance, affecting the Key and Thornless limes wherever they are grown. (Winston)

Citrus knot, Sphaeropsis tumefaciens Hedges, was reported of infrequent occurrence in Florida by Rhoads.

Orchids, (Ionopsis utricularioides (Sw.) Lendl., and Leochilus labiatus (Sw.) Kuntz.), occasionally destructive in Porto Rico. (Cook)

Dodder, Cuscuta sp., caused stunting of young citrus seedlings in Florida, according to Rhoads.

NON-PARASITIC DISEASES OF CITRUS AND THOSE OF UNKNOWN CAUSATION

Dieback, Exanthema, Fruit Ammoniation, Florida, "Of frequent occurrence." (Rhoads). "Of major importance; oranges most susceptible; worst in flatwood groves; Bordeaux spray on leaves or bluestone applied to the soil in spring gives good control." (Winston); California, "About the same as usual; of minor importance; mostly in San Diego and Venturia Counties; gum pockets in twigs and fruit, staining and cracking of fruit." (Fawcett)

CITRUS FRUITS - Non-Parasitic diseases

Frenching or Lime chlorosis was reported by Rhoads as being common and widely distributed in Florida. Winston reports less than usual and of minor importance; humus corrects the trouble. In California there is manifested a uniform yellowing of leaves where there is a calcareous substratum which probably brings about an iron deficiency. (Fawcett)

Mottle leaf was probably less than usual in California; investigations indicate a probable inability of the tree to satisfy its calcium requirements when the soil reaction is too alkaline. (Fawcett)

Gummosis (undet.) was reported by Rhoads as being widespread and frequently quite destructive, with tangerine trees appearing to be particularly susceptible in Florida. Winston reports it to be about the same as usual, of minor importance in Florida, and says that caustic disinfectant washes frequently cure the disease. Cook reports the disease as being severe sometimes in Porto Rico, and recommends treatment with carbolineum.

Psorosis (undet.) was reported by Rhoads and by Winston to be about the same as usual in Florida. Winston stated that it is of minor importance, and that caustic disinfectant paints or washes apparently cure the disease. California, "About the same as usual, affecting bark and wood of trunk and large limbs; coextensive with sweet oranges in the state, and the most important disease; grapefruit and occasionally tangerines are also affected; scraping method of treatment successful." (Fawcett)

Blight (apparently non-par.) was reported by Rhoads to be less common than formerly in Florida. It occurs most frequently on soils more or less closely underlaid by a coquina rock, less commonly on soils with a clay subsoil. Usually it is caused by a deficiency in the supply of available soil moisture during the dry season of the year, but often by excessive soil moisture for long periods in poorly drained situations with resultant death of roots. Winstor reports it to be of minor importance in Florida except in a few localities where it is killing quite a few trees.

Peteca (cause uncertain) was of minor importance in California, being probably less than usual; it occurred in winter on lemon fruits producing characteristic sunken spots or pits in the rind. (Fawcett)

Endoxerosis (Internal decline) attributed to water relation in part, was fairly important in California, causing internal drying and browning of fruit of lemon only. (Fawcett)

Fruit splitting (non-par.) about the same as usual in Florida; usually occurring when heavy rains follow a period of drought in late summer or fall. (Rhoads)

Frost injury was not recorded from Florida, Alabama, or Louisiana. According to Alsmayer, of Texas, the fruit was frozen on the trees the last week in December 1925, in Hidalgo and Cameron Counties, and the trees were moderately damaged.

Lightning injury. Several cases were reported in Florida, according to Rhoads. Winston reports more than usual in Florida, causing minor damage.

Recent literature on various citrus diseases

1. Barger, W. F. Treating oranges with borax solution for control of blue and green mold. California Citrograph 10: 149. 1925.

2. _____ and L. A. Hawkins. Borax as disinfectant for citrus fruit. Citrus Indust. 6 (9): 8-9, 24. 1925.

...ger, W. R., and L. A. Hawkins. Borax as a disinfectant for citrus fruit. Jour. Agric. Res. 3: 189-192. 1925.

Bartholomew, E. T. Report on internal decline (endoxerosis) of lemons. California Citrograph 10: 274, 294, 308. 1925.

5. Blanchard, V. F. Treatment of frost injured trees and fruit. California Citrograph 10: 148, 180-182. Mar. 1925.

6. Bragdon, K. E. Spray with Bordeaux-oil for control of melanose. Florida Grow. 32 (10): 15. Sept. 5, 1925.

7. Carne, W. M. Blue mold on oranges. Jour. Dept. Agr. Western Australia II, 2: 286-292. 1925.

8. _____ Citrus brown rot. Jour. Dept. Agr. Western Australia II, 2: 359. Sept. 1925.

9. _____ Citrus diseases. Brown rot and leaf blight. Jour. Dept. Agr. Western Australia II, 1: 519-522. Dec. 1924.

10. Doidge, E. M. Brown rot in citrus fruits (Pythiacystis citrophthora R. and E. Smith.) Jour. Dept. Agr. South Africa 10: 499-503. June 1925.

11. Fawcett, H. S. Observations on bark diseases of citrus trees in Sicily. Phytopath. 15: 41-42. Jan. 1925.

12. _____ Bark diseases of citrus trees in California. California Agr. Exp. Sta. Bull. 395: 1-61. Oct. 1925.

13. _____ The decay of citrus fruits on arrival and in storage at eastern markets. California Citrograph 10: 79, 98, 99, 103. 1925.

14. Fulton, H. R. and J. J. Bowman. Preliminary results with the borax treatment of citrus fruits for the prevention of blue mold rot. Citrus Indust. 6 (3): 10, 30, 31, 34. Mar. 1925.

15. _____ Relative susceptibility of citrus varieties to attack by Gloeosporium limetticolum (Clausen). Jour. Agric. Res. 30: 629-635. 1925.

16. Hodgson, R. W. Citrus trunk and root disease treatment. Amer. Fruit Grower 45 (2): 5, 44-45. 1925.

17. Jenkins, Anna E. The citrus scab fungus. Phytopath. 15: 99-104. 1925.

18. Kamat, M. N. Gummosis of citrus trees. Poona Agr. Coll. Mag. 17: 86-88. Sept. 1925.

19. Kater, J. M. Morphology and life history of Polytomella citri sp. nov. Biol. Bull. 49: 213-236. Sept. 1925.

20. Katzprowsky, S. Formaldehyde gas, a possible control of decay in lemons. California Citrograph 10: 254. May 1925.

21. Kay, A. O. Soil moisture studies in relation to diseased tree conditions in Brevard County. Citrus Indust. 6 (8): 5-9, 22-23. 1925.

22. Lambert, M. E. The present status of the citrus scab fungus - a recent discovery. Citrus Indust. 6(4): 11. Apr. 1925.

23. Lee, H. A. The comparative resistance to footrot of various citrus species as root stocks. Philipp. Jour. Sci. 27: 243-254. June 1925.

24. Lewcock, H. K. A citrus bacteriosis occurring in South Australia. (Abstract) Phytopath. 16: 80. Jan. 1926.

25. Smith, J. L. Safeguarding Satsumas from damage by cold waves. Florida Grower 32 (11): 7. 1925.

26. Stevens, Neli E. and Marguerite S. Wilcox. The citrus stem-end rot "Diplodia;" its life history and relation to Sphaeropsis malorum. Phytopath. 15: 332-340. 1925.

27. Webber, H. J. A comparative study of the citrus industry of South Africa. Bul. Dept. Agr. South Africa 1925 (6): 1-106. 1925.

28. Wickens, G. W. Exanthema of citrus trees. Rep. Proc. Imp. Bot. Conf. London 1924: 353-357. 1925.

29. Winston, J. R., J. J. Bowman, and W. J. Bach. Relative susceptibility of some rutaceous plants to attack by the citrus-scab fungus. Jour. Agr. Res. 30: 1087-1093. 1925.

30. Winston, J. R. Control melanose and thereby prevent "ammoniation." Citrus Indust. 6 (4): 9, 40, 44. Apr. 1925.

31. _____ Commercial control of citrus melanose in Florida in 1923. Proc. Florida State Hort. Soc. 37 (1924): 127-129. 1924.

FIG

Rust caused by Physopella fici (Cast.) Arth. was reported as less than usual in Georgia (Boyd) and Louisiana (Edgerton). Unimportant in Texas. (Taubenhaus)

Leafspot caused by Cercospora sp. was reported as prevalent in Georgia (Boyd) and Texas (Taubenhaus)

FIG TO DATE PALM

Anthracnose caused by Glomerella cingulata (Ston.) Spauld. & Schrenk was reported as unimportant in South Carolina (Fenner) and Georgia (Boyd).

Soft rot causing a loss of 5 per cent in Georgia was attributed to Aspergillus sp. and Rhizopus sp., according to Boyd, this amount being less than usual due to dry weather. According to Taubenhaus of Texas a loss of one-half per cent was estimated for soured fruits, cause unknown.

Limb blight caused by Corticium sp. was reported from Georgia by Boyd.

Twig blight was reported from Washington by Frank as caused by Botrytis sp.

Canker caused by Tubercularia fici Edgerton was found in about 50 per cent of the plantings in Georgia, causing a loss of 5 per cent, through death of twigs and limbs, and in some cases entire trees. (Boyd)

Canker caused by Macrophoma fici Alm. & Cam. was reported from Texas. (Taubenhaus)

Texas root rot caused by Ozonium omnivorum Shear was prevalent in the black lands of Texas, causing slight loss. (Taubenhaus) Reported as threatening damage in Arizona.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was reported from a nursery in Georgia. (Boyd) Prevalent in Texas causing trace of damage. (Taubenhaus)

Premature dropping (non-par.) was very prevalent in Texas. (Taubenhaus)

Recent literature on fig diseases

1. Brown, Nellie A. A note on a rot of the Smyrna fig in California. Science n.s. 62: 288. 1925.

2. Caldis, Panos D. A rot of the Smyrna fig in California. Science n.s. 62: 161-162. 1925.

3. Fairbanks, R. B. The fig industry in Texas. Amer. Fruit Grower 45 (4): 8, 20. 1925.

4. Maffei, L. Sul parassitismo di Phomopsis cinerescens (Sacc.) Trav. sopra i rami del Fici. (On the parasitism of Phomopsis cinerescens (Sacc.) Trav. on the branches of the Fig.) Riv. Patol. Veg. 15: 37-47. 1925.

5. Phillips, E. H., E. H. Smith, and R. E. Smith. Fig smut. California Agr. Exp. Sta. Bul. 387: 1-38. 1925.

DATE PALM

Rust caused by Graphiola phoenicis (Moug.) Poit. Unimportant in Texas (Taubenhaus); Porto Rico (Cook).

Leafspot caused by Exosporium palmivorum Sacc., Texas (unimportant).

Pestalozzia blight caused by Pestalozzia sp., Texas (unimportant).

Recent literature

1. Pinoy, P. E. Sur la maladie du "Bayoud" des palmiers de Figuig. Compt. Rend. Soc. Biol. Paris 92: 137-138. Jan. 1925.

PINEAPPLE TO AVOCADO

PINEAPPLE

Fruit rot caused by Thielaviopsis paradoxa (de Seyn.) Hoehn. was reported from Porto Rico as sometimes severe on fruit; unimportant during 1925. (Cook) This disease was reported by Roldan as new to the Philippine Islands.

Chlorosis, due to too much lime, was reported from Porto Rico. Good results were obtained from spraying with iron sulfate. (Cook)

Rootrot (cause not given) was reported as troublesome in Florida.

Recent literature

1. Lyman, L. T. The rootrot problem from the field standpoint. Ann. Short Course Pineapple Prod. Hawaii Univ. Ext. Serv. Dept. 4: 99-105. 1925.

2. Roldan, E. F. The soft rot of pineapple in the Philippines and other countries. Philipp. Agr. 13: 397-405. Feb. 1925.

3. Sideris, C. P. Physiological and pathological studies on pineapples. Ann. Short Course Pineapple Prod. Hawaii Univ. Ext. Serv. Dept. 4: 87-99. 1925.

OLIVE

Knot or tubercle disease caused by Bacterium savastanoi EFS. was reported from California as being more serious than usual, killing many limbs or twigs; occurs only in Sacramento and lower San Joaquin Valleys; favored by copious spring and winter rains; Manzanillo variety mainly attacked. (Horne)

Dry rot (soft nose), probably physiological, was reported to be more serious than usual in California. Losses as high as 50 per cent occurred in some orchards; fruit soft at end, shrivels, and spoils; mostly confined to Sevillano variety. (Horne)

Recent literature

1. Laubert, R. Die Zweigkrankheit der Oliven. (The branch disease of olives.) Gartenwelt 29: 502. 1925.

AVOCADO

Scab caused by Sphaceloma sp. was reported as widespread in Florida causing serious leaf spotting.

Anthracnose caused by Colletotrichum gloeosporioides Penz. was reported as destructive on young fruit and on succulent new growth in Florida. Common but unimportant in Porto Rico. (Cook & Tucker)

AVOCADO TO PAPAYA

Leafspot caused by Pestalozzia guepini Desm. was reported as local in Florida. In Porto Rico it kills young seedlings and branches on larger trees. (Cook) It is unimportant in Texas.

Leafspot caused by Phyllosticta sp. was reported to be of little importance in Florida.

Tar spot caused by Phyllachora gratissima was reported as being common in high places in Porto Rico. (Cook & Tucker)

Southern blight caused by Sclerotium rolfsii Sacc. was reported as occurring in one instance on nursery plants in Florida.

Footrot (cause not indicated) caused some loss in nursery plantings and newly set trees in Florida; not serious.

Algal leafspot caused by Cephaleuros virescens Kunze was reported as not serious in Florida. Very common in Porto Rico.

Recent literature

1. Anon. Avocado black spot can be controlled by Bordeaux mixture. Florida Grow. 31 (1): 34. Jan. 3, 1925.

2. Horne, Wm. T. Preliminary notes on avocado fruit decay. (Abstract) Phytopath. 16: 80. Jan. 1926.

MANGO

Anthracnose caused by Colletotrichum gloeosporioides Penz. was reported as being widespread and destructive in Florida, attacking the fruit and twigs, and causing damping-off of seedlings. Common in Porto Rico.

Leafspot caused by Pestalozzia guepini Desm. was reported from Porto Rico.

Leafspot caused by Septoria sp. was reported as unimportant in Florida.

Sooty mold caused by Meliola mangiferae Earle was reported to be common in Porto Rico.

Withertip caused by Diplodia sp. was reported as not severe in Porto Rico.

Trunk galls (cause not indicated) were reported from Porto Rico.

PAPAYA

Leafspot caused by Pucciniopsis caricae Earle was reported to be widespread but unimportant in Florida; also reported from Porto Rico.

Recent literature

1. Mowry, Harold. Papaya culture. Florida Grower 32 (3): 36. 1925.

2. Uphof, J. C. TH. Das Verhalten von Pucciniopsis caricae Earle auf der Papaya (Carica papaya) in Florida. (Pucciniopsis caricae Earle, on Carica papaya in Florida.) Zeitschr. Pflanzenkrankh. 35: 118-122. 1925.

GUAVA TO PERSIMMON

GUAVA

Anthracnose caused by Colletotrichum gloeosporioides Penz. was reported from Florida; in one instance destroyed young fruit and leaves. Abundant in Porto Rico.

Leafspot and fruitrot caused by Gloeosporium psidii Del. was reported from several localities in Florida.

Leafspot caused by Pestalozzia sp. was found in a few localities in Florida; unimportant.

Root and trunk rot caused by Clitocybe monadelpha (Morgan) Sacc. (C. tabescens (Scop.) Bres.) was reported from a number of localities in Florida.

BANANA

Anthracnose caused by Gloeosporium musarum Cke. & Mass. was reported as common on all varieties in Porto Rico. (Cook & Tucker)

Wilt caused by Fusarium cubense EFS. was reported to be destructive on certain varieties throughout Porto Rico. (Cook & Tucker)

Recent literature

1. Ashby, S. F. Researches on Panama disease. Proc. West. Indian Agr. Conf. 9 (1924): 51-53. 1925.

2. Benson, A. H. Leafspot on bananas. Queensl. Agr. Jour. 24: 392-393. Oct. 1925.

3. Campbell, J. G. C. Banana diseases in Vitilevu. Agric. Circ. Dept. Agr. Fiji 5: 67-75. Jan.-June 1925.

4. Hansford, C. G. Some remarks on questions raised by the Panama disease of bananas. Proc. West Indian Agr. Conf. 9 (1924): 41-50. 1925.

5. _____ and J. B. Sutherland. Panama disease of bananas. Jour. Jamaica Agr. Soc. 29: 237-240. 1925.

6. Tryon, H. Banana - internal fruit discoloration. Queensland Agr. Jour. 24: 122-123. 1925.

PERSIMMON

Leafspot caused by Cercospora sp. was reported to be general in the coastal plain region of Georgia, causing defoliation. Found generally in Florida but causing little damage.

Leafspot caused by Pestalozzia guepini Desm. was reported to be very common in Florida, causing defoliation in late fall.

PERSIMMON TO POMEGRANATE
PECAN - Scab

Leafspot caused by Ramularia sp. was reported from western Florida.

Black mold caused by Macrosporium sp. was reported from western Florida, causing some defoliation.

Leaf speck caused by Leptothyrium pomi (Mont. & Fr.) Sacc. was more or less common on the fruits in Florida.

Anthracnose caused by Gloeosporium diospyri Ell. & Ev. was generally found in Florida, causing some withertip.

Hypochnose caused by Corticium stevensii Burt was reported from one locality in Florida.

BREADFRUIT

Rust caused by Uredo artocarpi Berk. & Br. was reported from Porto Rico. (Tucker)

Algal leafspot caused by Cephaleuros virescens Kunze was reported from Porto Rico. (Tucker)

POMEGRANATE

Leafspot caused by Cercospora lythracearum Heald & Wolf was reported from Florida as unimportant.

Anthracnose caused by Colletotrichum sp. was reported on fruit and twigs in Florida.

DISEASES OF NUTS

PECAN

SCAB CAUSED BY FUSICLADIUM EFFUSUM WINT.

Pecan scab is probably the most important disease of this crop.

South Carolina: Less than usual. Occurred throughout the Sandhill region northward to the edge of Piedmont area. (Fenner)

Georgia: Pecan scab was very important in spite of general shortage of rainfall. Estimated loss 5 per cent. Most prevalent in the southernmost counties, especially in heavy plantings of Schleys. Rainfall during May, June, and July being lighter and less frequent than usual accounted for less injury than usual. Delmas were a total loss in most sections. Alleys and Schleys were less susceptible and scabbing about same. Much less on Van Deman than Schley. Mobile and Frotcher showing considerable nut infection. (Boyd)

PECAN - Scab; Powdery mildew; Rosette

Florida: Common wherever the host was growing in the state. The disease was generally worse than last year. Of considerable economic importance. (Weber)

Mississippi: Light infection on account of drouth. (Beal)

According to Demaree (1) all fungicides tried were found inferior to Bordeaux mixture in controlling scab. Bordeaux, however, causes severe foliage injury under certain conditions. Data from four orchards indicate that the cost of spraying pecans ranges from 30 to 95 cents per tree. Dusts were found to be of little value. Topworking of susceptible varieties, orchard sanitation, including plowing, and spraying with Bordeaux are recommended.

Working under Mississippi conditions Neal (2) reports the results of Bordeaux-oil emulsion for pecan scab control.

> "After the success we have obtained with it in pecan spraying under Mississippi conditions, especially for combating scab during wet seasons, we believe it far superior to the plain Bordeaux mixture, Bordeaux fish-oil soap, or other fungicides which we have used."

Recent literature

1. Anon. Spray pecans this summer and control scab disease. Citrus Industr. 6 (6): 14. June 1925.

2. Demaree, J. B. Progress report on pecan scab spraying experiments. Proc. 23d Ann. Conv. Nat. Pecan Growers Assoc. 1924: 58-61. 1925.

3. Demaree, J. B. Apparent limitations to pecan scab control. Amer. Nut Jour. 12: 41-42. Mar. 1925.

4. Neal, D. C. Bordeaux-oil emulsion for pecan scab control. Proc. 23d Ann. Conv. Nat. Pecan Growers Assoc. 1924: 61-63. 1925.

POWDERY MILDEW CAUSED BY MICROSPHAERA ALNI (WALLR.) WINT.

This disease was reported from Georgia, Florida, and Texas. According to Boyd of Georgia, the varieties Mobile and Success in one orchard were heavily infected. In Florida, according to Weber, it was common on nursery stock where it caused considerable damage but otherwise was not serious.

ROSETTE (UNKNOWN)

Rosette was reported from South Carolina, Georgia, Florida, Texas, and Kansas. A 10 per cent loss was reported from Georgia.

Georgia: Seen on all of the varieties common here. Trees affected with this disease usually set very lightly or not at all. Many badly affected trees lost their leaves entirely during September and

October. Most serious disease of the state. Recommend improvement of soil by cultivation and fertilization, especially the addition of organic matter. (Boyd)

Recent literature

1. Skinner, J. J. and J. B. Demaree. Relation of soil conditions and orchard management to the rosette of pecan trees. U. S. Dept. Agr. Bul. 1378: 1-16. Feb. 1926.

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, Florida (on a few seedlings, not common).

Botryosphaeria berengeriana De Not., dieback, South Carolina (serious locally), and Florida (common and occasionally serious).

Cercospora fusca (Heald & Wolf) Amend. Rand, brown leafspot, Georgia, Florida, and Texas. In Georgia, brown spot was reported by Boyd to be "Of minor importance this year, except on trees affected with rosette."

Corticium stevensii, Florida (not common)

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, Georgia (very little importance), Florida.

Microstroma juglandis (Bereng.) Sacc., leafspot, Florida.

Mycosphaerella convexula (Schw.) F. V. Rand, leaf blotch, Florida.

Pestalozzia uvicola, leafspot, Florida (common but not important).

Phyllosticta caryae Pk., leafspot, Georgia (slight importance).

Blackpit (non-par.) Reported from Georgia where it was thought to cause 2 per cent loss. According to Boyd, Frotcher and Schley were injured most heavily, drops of 5 to 15 per cent being noted. One planting of Delmas were beginning to rosette to the extent of 35 per cent loss while Stewart and Schley in the same orchard were not materially affected.

Die-back (undet.), Kansas (slight).

Mouse ear (non-par.), Florida (not common. On bearing trees and nursery stock).

Texas root rot, Texas, Arizona. (Ozonium omnivorum Shear)

Recent literature

1. Mahan, F. A. Spray injury to pecan trees. Nat. Pecan Exchange News 2: 6-7. May 1925.

2. Wenzel, O. J. Woodrot in pecan trees. Nat. Pecan Echange News 2: 9-12. July 1925.

ENGLISH WALNUT

BACTERIAL BLIGHT CAUSED BY BACTERIUM JUGLANDIS (N. B. PIERCE) EFS.

This disease was reported to be very important in Oregon where it caused a loss estimated at 33 per cent and in California where the loss was estimated

at 4 per cent. According to Barss of Oregon, much more bacterial blight occurred this year than in 1924. Some of the larger growers reported it worse on seedling trees than on grafted trees while usually the reverse is true. Milbrath, of California, reported the disease worse this year than last year in all parts of the state.

JAPANESE WALNUT

Rosette (undet.) South Carolina. "Have had one report about September 1 of the rosette disease on Japanese walnut. It resembles pecan rosette a good deal. A detailed description cannot be given as the disease was not seen in the field. This is the first time I have seen the disease on this host." (Ludwig)

FILBERT

Bacterial blight caused by Bacillus coryli was said by Barss to be much less prevalent than in 1924 in Oregon, but it is always an important disease in that state especially on young trees 1 to 5 years old or on the small wood of older trees.

ALMOND

Scab caused by Cladosporium carpophilum Thuem., Oregon (no importance).

Brownrot caused by Sclerotinia cinerea (Bon.) Schroet., California, (worse this year than last, destructive on Drake variety; blossom and twig infection in the San Joaquin Valley.)

Rust caused by Tranzschelia punctata (Pers.) Arth., California, (worse than last year causing premature leaf dropping.)

Recent literature

1. Smith, R. E. and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

2. Taylor, R. H. and G. L. Phillip. The almond in California. California Agr. Exp. Sta. Circ. 284: 1-57. Apr. 1925.

COCONUT - Budrot; Miscellaneous Diseases; Literature.

COCONUT

BUDROT CAUSED BY PHYTOPHTHORA FABERI MAUB.

This disease was reported from Porto Rico and Florida. In Porto Rico it was severe along the west coast. According to A. S. Rhoads, of Florida, "Phytophthora faberi has not been found in the south central and southwestern portions of the state, but is generally distributed along the southeast coast where 95 per cent of the coconuts are found. In a nursery near Miami 12 per cent of the plants have been destroyed by budrot. From 350 collections of budrotted plants, 68 have yielded Phytophthora faberi. In making isolations from budrotted plants such organisms as bacteria, yeasts, nematodes, etc. are found associated with the condition, but their true role has not been determined.

MISCELLANEOUS DISEASES AND INJURIES

Colletotrichum sp., anthracnose, Florida and Porto Rico. "This organism occasionally causes a premature falling of the fruit. Not important in Porto Rico." (Cook) In Florida it is coexistent with the host, causes severe spotting of the leaves and petioles and is of some importance to young plants.

Exosporium sp., leafspot, Florida (few cases, of minor importance).

Pestalozzia palmarum Cke., leafspot, reported from Florida (general, some damage on nursery plants) and Porto Rico.

Phyllosticta sp., leafspot, Florida (quite common on leaves but of little or no importance).

Thielaviopsis paradoxa (De Seyn.) Hoehn., stem-bleeding disease, Porto Rico and the Philippine Islands. According to Roldan (11) this organism causing softrot of pineapple, pineapple disease of sugar cane, and coconut stem-bleeding disease recently broke out in the Philippines. It is present also in Hawaii, Java, West Indies, India, Ceylon, and southern United States.

In Florida a disease called "bitten leaf" and caused by this same fungus was found quite generally on both young and old plants. In this case the chief damage was the curling of the leaflets and occasional destruction of the bud. Has been found to attack also the roots of young plants.

Recent literature

1. Ashby, S. F. Budrots of the coconut palm in the West Indies. Rep. Proc. Imp. Bot. Conf. London 1924: 153-158. 1925.

2. _____ Red ring disease of the coconut. Proc. West. Indian Agr. Conf. 9: 164-172. 1925.

3. _____ Budrot of coconut palms in Porto Rico. Tropical Agriculture 2: 201. Sept. 1925.

4. Butler, E. J. Budrot of coconut and other palms. Rep. Proc. Imp. Bot. Conf. London 1924: 145-153. 1925.

COCONUT - Miscellaneous Literature

5. Dowson, W. J. Some observations on the budrot disease of coconut palms on the east coast of Africa. Rep. Proc. Imp. Bot. Conf. London 1924: 159-161. 1925.

6. Gadd, C. H. Inoculation experiments with Phytophthora faberi Maubl. Yearbook Dept. Agr. Ceylon 1925: 15-17. 1925.

7. Nowell, W. Coconut budrot in Trinidad. Rep. Proc. Imp. Bot. Conf. London 1924: 161-162. 1925.

8. _____ Coconut budrot in Trinidad. Trop. Agr. 64: 277. May 1925.

9. Newell, Wilmon. Report of plant commissioner for the biennium ending June 30, 1924. Florida State Plant Bd. Quart. Bul. 9: 59-117. 1925.

10. Petch, T. A thread blight on coconuts. Yearbook Dept. Agr. Ceylon 1925: 27-28. 1925.

11. Roldan, E. F. The soft rot of pineapple in the Philippines and other countries. Philipp. Agr. 13: 397-405. Feb. 1925.

12. Sharples, A. Observations on budrot of Palms. Rept. Imper. Bot. Conf. London 1924: 147-153. 1925.

13. Shepherd, E. F. S. Une maladie suspecte des racines du cocotier. Rev. Agr. Ile Maurice 1925: 482-484. May-June 1925.

14. Tucker, C. M. Coconut budrot experiments in Porto Rico. Science 61: 186-187. 1925.

15. _____ Controlling coconut budrot. West India Comm. Circ. 40: 44. Jan. 1925.

16. _____ Mesures de contrôle de la pourriture du coeur du cocotier. Rev. Agr. Ile Maurice 1925: 421-422. Mar.-April 1925.